Digitally Preserving
Your Family History and Heritage

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Presentation Description: Your family history resides in many forms from pictures and journals to movies and scrapbooks. Learn about digital resources, strategies, and examples of how to easily preserve, share, and use your family history.

The following material is a compilation of personal experience and resources.

Digitizing

Why Digitize?
As genealogists and family historians the main reasons to digitize are to enhance access or share information and improve preservation. We are able to take bits and pieces of our heritage that are scattered among family members and put them together in a collection that can be shared via CD/DVD and web.

Preservation through Digitization
Digitization can also help preserve precious materials. Making high-quality digital images helps to reduce wear and tear on fragile items. This does not mean, however, that digital copies should be seen as a replacement for the original artifact. Even after digitization, original documents and artifacts must be cared for, as digital files are not permanent and must be periodically transferred to new formats.

The Fragility of Digital Materials
It's not secret how fragile our digital images are. We have lost a document, or not been able to open a file because the image was corrupted or we didn't have the software. Digital images are here to stay. In 2003, less than .01 percent of world's information was produced with ink and paper.

How long will the media last? The estimates range from 20-200 years for media such as CD/DVDs. The Library of Congress, which holds over 150,000 audio CDs in optimal condition, estimated that 1-10 percent of their discs in their collection have serious errors.

Digital images offer us the ability to perfectly store an image and precisely reproduce that image every time we use it. From the master file we are able to easily make perfect duplicates in an array of formats depending upon our need (e.g., printing and sharing via internet, CD). It's that same perfection that creates our dilemma.

With digital files, any amount of distortion can make the file unusable. A magnetic field or a stray static charge can cause irreversible damage to a digital file (e.g., Word document, spread sheet,

photo, or website). An image can experience pixel distortion that blurs a portion of the image or can cause the file to be completely unusable.

Simple things such as forgetting a password can make a collection inaccessible. Digital images require hardware, operating systems, and software to view and read them properly.   A simple change in the operating system can make a computer unusable because its capacity is not large enough to manage the new files.   A software program used to create a file is the only software that can read the image and thus the ability to share is dramatically limited.

Digital libraries give us the ability to search thousands of documents in seconds that might otherwise take weeks, months, or even years of tedious searching to find.

Digital preservation is a very serious matter. With technology changing so fast, there are no absolutes about the exact formula for digitally preserving our family heritage which will be a combination of artifacts that include text, data, and images, audio and video. However, there are some best practices of archivists that have responsibility for preserving our national and cultural heritage that we can learn from.

Planning for Digitization

Digitizing your family projects are more about methods and procedures (i.e., fundamentally sound operating principles in the creation and storage of digital images) and less about hardware and software (e.g., today's technologies, file formats and media). It's about project planning and identifying the artifacts or material that will be digitized and then deciding what is the best method to digitize the material based on your resources (e.g., budget and time). You will be asking questions such as:

- Can the goal be achieved by book, video, or presentation?
- Who is going to have access to the material?
    - (e.g., Yourself, immediate family, extended family, WW Web)
- What materials are you going to digitize and why?
    - (e.g., Photos, journals, cards/letters, documentation, maps, artifacts)
- What is the scope of your project?
    - (e.g., all photos & artifacts of six family lines descending from a common progenitor, your high school years, last summer's vacation, the life story of a parent)
- Who has the originals and will you get access to them?
- Of the originals that you have, what are you going to digitize?
- How are you going to preserve the originals?

What Parts of My Family History Should I Preserve?

Think about those pieces of family history you wish you had that either were not captured or were lost due to any number of reasons. I remember after my Mom's passing, finding an envelop that contained over 200 Polaroid photos that were taken in the 1970's and 80's, less than 10 percent were salvageable.

What's worth preserving? What parts of your family history would you consider to be important enough to classify as "permanent" for expending resources (i.e., time, money, and equipment) to preserve? Set up a system of a core set of questions with an associated rating system.

1. Is the information the picture, document, or artifact holds unique?
2. How significant is the source and context of the record?
3. How significant are the records for research (current and projected in the future)?
4. Do these documents help in finding other more permanent records?
5. Are these records related to other permanent records? Some records by themselves have limited value but when added to other records become very important to help tell a larger story.
6. How useable are the records? (i.e., are they deteriorated to such a degree that they will be unreadable in the near future?)
7. What are the cost considerations for the long-term maintenance of the record? (e.g., are they on paper that may decay and thus require expensive preservation work?)
8. What is the volume of the records (i.e., the more records there are, the more it will cost to store them.)

Two Tier Digitizing and Archiving Evaluation

The first phase is to decide the relevance of digitizing and archiving the subject matter. If I can answer yes to any one of the questions 1-5, I will certainly digitize. Overall, I will digitize and archive about 90 percent of records/images. The 10% remaining are images that I have a better copy of or in the case of a children's activity when I may take 25-plus images and choose the top 10-20 percent and discard the rest.

Barry Rating-Part 1: To Digitized or Not To Digitize	Yes	No
1. Is the information the picture, document, or artifact holds unique?		
2. How significant is the source and context of the record?		
3. How significant are the records for research (current and projected in the future)?		
4. Do these documents help in finding other more permanent records?		
5. Are these records related to other permanent records? Some records by themselves have limited value but when added to other records become very important to help tell a larger story.		
Barry's Rule of Thumb: Overall I will digitize and archive about 90 percent of records/images. The 10% remaining are images that I have a better copy of or in the case of a children's activity when I may take 25-plus images, and choose the top 10-20 percent and discard the rest.		

The second filter is to categorize images and rank them between 1 to 5 stars. (Software image manager permits categorization and ranking of images)

1-4 star rating system for prioritizing your preservation efforts:

Barry Rating- Part 2: Rating Images for Later Use				
4 Star	3 Star	2 Star	1 Star	0 Star
• Rare photographs of a person (no matter the quality). • Primary record to prove or highlight religious or civil ordinances of family in the direct line. • Best representation of a series of images from important events. (e.g., family gathering) • Annual one of a kind family or individual photo. (e.g., school photo)	• Records that contain important information about a direct family line. • For a family history story of ancestors in a direct line. • Images that are the best representation of a series of images. (e.g., family gathering or sports event)	• Records of collateral lines. • Images of artifacts that were of importance from ancestors in direct line. (e.g., scan of watch) • Photograph images of direct line that are similar to other images in categories 3 or 4. • A series of images from published material. (e.g., family history book) • Images that have been gathered from other individuals and still waiting to be named and sorted.	• Records or images that support existing records which help tell the story or build a timeline.	• For records that were used once in research. • Extra photo shots of an event that are not needed to tell the story but nice to have or which one is unable to delete.

Defining Digital Image File Types Explained
There and many file types that are used to encode digital images. The choices are similar but have different characteristics and are best suited for specific applications. You will often hear file types referred to as "Loosy" or "Lossless" compression.

- **Lossless.** A compression technique that decompresses data back to its original form without any loss. The decompressed file and the original are identical. All compression methods used to compress text, databases and other business data are lossless. For example, the ZIP archiving technology (PKZIP, WinZip, etc.) is a widely used lossless method.

- **Lossy** A compression technique that does not decompress data back to 100% of the original. Lossy methods provide high degrees of compression and result in very small compressed files, but there is a certain amount of loss when they are restored.

Audio, video and some imaging applications can tolerate loss, and in many cases, it may not be noticeable to the human ear or eye. In other cases, it may be noticeable, but not that critical to the application. The more tolerance for loss, the smaller the file can be compressed, and the faster the file can be transmitted over a network. Examples of lossy file formats are MP3, AAC, MPEG and JPEG.

The most common file types that you will see referred to most often in digitizing are BMP, GIF, JPG, PNG, RAW, TIFF. The following is brief overview of each.

1. **BMP** is an uncompressed proprietary format invented by Microsoft. There is really no reason to ever use this format.

2. **GIF** creates a table of up to 256 colors from a pool of 16 million. If the image has fewer than 256 colors, GIF can render the image exactly. When the image contains many colors, software that creates the GIF uses any of several algorithms to approximate the colors in the image with the limited palette of 256 colors available. Better algorithms search the image to find an optimum set of 256 colors. Sometimes GIF uses the nearest color to represent each pixel, and sometimes it uses "error diffusion" to adjust the color of nearby pixels to correct for the error in each pixel.

   GIF achieves compression in two ways. First, it reduces the number of colors of color-rich images, thereby reducing the number of bits needed per pixel, as just described. Second, it replaces commonly occurring patterns (especially large areas of uniform color) with a short abbreviation: instead of storing "white, white, white, white, white," it stores "5 white."

   Thus, GIF is "lossless" only for images with 256 colors or less. For a rich, true color image, GIF may "lose" 99.998% of the colors.

3. **JPG** is optimized for photographs and similar continuous tone images that contain many, many colors. It can achieve astounding compression ratios even while maintaining very high image quality. GIF compression is unkind to such images. JPG works by analyzing images and discarding kinds of information that the eye is least likely to notice. It stores information as 24 bit color. Important: the degree of compression of JPG is adjustable. At moderate compression levels of photographic images, it is very difficult for the eye to discern any difference from the original, even at extreme magnification. Compression factors of more than 20 are often quite acceptable. Better graphics programs, such as Paint Shop Pro and Photoshop, allow you to view the image quality and file size as a function of compression level, so that you can conveniently choose the balance between quality and file size.

4. **PNG** is also a lossless storage format. However, in contrast with common TIFF usage, it looks for patterns in the image that it can use to compress file size. The compression is exactly reversible, so the image is recovered exactly. PNG is superior to GIF. It produces smaller files and allows more colors. PNG also supports partial transparency. Partial transparency can be used for many useful purposes, such as fades and antialiasing of text. Unfortunately, Microsoft's Internet Explorer does not properly support PNG transparency, so for now web authors must avoid using transparency in PNG images or

direct their users to Mozilla or Firefox browsers. PNG is of principal value in two applications:

- o If you have an image with large areas of exactly uniform color, but contains more than 256 colors, PNG is your choice. Its strategy is similar to that of GIF, but it supports 16 million colors, not just 256.
- o If you want to display a photograph exactly without loss on the web, PNG is your choice. Later generation web browsers support PNG, and PNG is the only lossless format that web browsers support.

5. **RAW** is an image output option available on some digital cameras. Though lossless, it is a factor of three of four smaller than TIFF files of the same image. The disadvantage is that there is a different RAW format for each manufacturer, and so you may have to use the manufacturer's software to view the images. (Some graphics applications can read some manufacturer's RAW formats.)   Use RAW only for in-camera storage, and copy or convert to TIFF, PNG, or JPG as soon as you transfer to your PC. You do not want your image archives to be in a proprietary format. Although several graphics programs can now read the RAW format for many digital cameras, it is unwise to rely on any proprietary format for long term storage. Will you be able to read a RAW file in five years? In twenty? JPG is the format most likely to be readable in 50 years. Thus, it is appropriate to use RAW to store images in the camera and perhaps for temporary lossless storage on your PC, but be sure to create a TIFF, or better still a PNG or JPG, for archival storage.

6. **TIFF** is, in principle, a very flexible format that can be lossless or lossy. The details of the image storage algorithm are included as part of the file. In practice, TIFF is used almost exclusively as a lossless image storage format that uses no compression at all. Most graphics programs that use TIFF do not use compression. Consequently, file sizes are quite big. (Sometimes a lossless compression algorithm called LZW is used, but it is not universally supported.)

In addition to the file types previous described you also see proprietary formats such as PSD and PSP used by graphic programs and PDF.

- • Photoshop's files have the **PSD** extension, while Paint Shop Pro files use **PSP**. These are the preferred working formats as you edit images in the software, because only the proprietary formats retain all the editing power of the programs. These packages use layers, for example, to build complex images, which allows images to be rearranged under and over each other for placement. This information may be lost in the nonproprietary formats such as TIFF and JPG. However, be sure to save your end result as a standard TIFF or JPG, or you may not be able to view it in a few years when your software has changed.

- • **PDF** (Portable Document Format) (PDF), is an open file format created by Adobe Systems. It is used for representing two-dimensional documents in a device independent and resolution independent fixed-layout document format. Each PDF file encapsulates a complete description of a document that includes the text, fonts, images, and graphics that compose the document. PDF files do not encode information that is specific to the application software, hardware, or operating system used to create or view the document.

This feature ensures that a valid PDF will render exactly the same regardless of its origin or destination. PDF files are most appropriately used to encode the exact look of a document in a device-independent way. While PDF can describe very simple one page documents, it may also be used for many pages, complex documents that use a variety of fonts, graphics, colors, and images.

Another reason for the many file types is that images differ in the number of colors they contain. If an image has few colors, a file type can be designed to exploit this as a way of reducing file size.

Which Image File Format Should You Use?

The most common image file formats, the most important for general purposes today, are TIF, JPG, GIF, and PNG. These are not the only choices, but they are good and reasonable choices.

Best file types for these general purposes:

	Photographic Images	Graphics, including Logos or Line art
Properties	Continuous tones, 24 bit color or 8 bit gray, no text, few lines and edges	Solid colors, up to 256 colors, with text or lines and sharp edges
Best Quality for Archived Master	TIF or PNG (no JPG artifacts)	PNG or GIF or TIF (no JPG artifacts)
Smallest File Size	JPG with a higher quality factor can be decent (JPG is questionable quality for archiving master copies)	TIF, LZW, GIF or PNG (graphics/logos usually permit reducing 2 to 16 colors for smallest file size)
mum Compatibility (PC, Mac, Unix)	IF or JPG (the simplest programs may not read TIF LZW)	TIF without LZW or GIF
Worst Choice	256 color GIF is very limited color, and is a larger file than 24 bit JPG	JPG compression adds artifacts, smears text and lines and edges

Technical Considerations

As you preserve documents, you should be neutral with regard to hardware and software platforms. As we have all experienced, the technology you use today will eventually go away.

Digital Image and Folder Naming Strategy

There is nothing more frustrating than spending several hours looking for one image that you really need. Two key strategies will help keep your photos organized: naming your images consistently and sorting them into folders.

Create A Logical Folder Structure

Folders are the best way to organize family history images. I organize my folders very similar to the way I organize the paper files which make it easy to find and place images. My folder hierarchy is as follows:

> Surname Folder
> > Direct Descendent Folder
> > > Category Folder
> > > > Image Files

For example:
> JONES
> > Ora Jones
> > > Correspondence
> > > > JONES-COR-Mary_Jones_Writes_Barry_Ewell-2_Feb_1976
> > >
> > > Documents
> > > > JONES-DOC-Mary_Jones_Marriage_Certificate-1955
> > >
> > > Histories and reference (H&R)
> > > > JONES-H&R-History_of _Mary_Jones-1997-pp 2-3
> > >
> > > News
> > > > JONES-NEWS-Mary_Jones_25_Yr_Service Award-1990
> > >
> > > Obituary
> > > > JONES-OBIT-Mary_Jones_Dies_of_Cancer_1998
> > >
> > > Photograph
> > > > JONES-PHOTO-Mary_Jones_Family_1965

I will add category folders as needed. The key is that I keep the same name of Category folders across all folders. For example, you could have a folder named Vacations and then have categories set up by years, 1990, 1991, 1992.   When my sub categories begin to expand, I will sub-divide categories. For example:

> Documents
> > Letters
> > Land Records
> > Vital Records
> Census

Barry's File Name Scheme

I've reviewed and thought about the naming schemes I use for family history and the following works extremely well for me, both in identifying where the image will be filed, who is in the image, and for searching on the images. I am usually able to find what I need within a couple of minutes at most. For example:

> **Surname-**Category-Individual Name**,** Description/Title, Date, Year, pp
> (If needed, # to indicate extension of article, more than one copy, page number, etc.)
>
> **Example:** JONES-OBIT-Mary_Jones_Dies_of_Cancer-1998
>
> Ex. 1-Correspondence: JONES-COR-Mary_Jones_Writes_Barry_Ewell_on_Mission-2_Feb_1976
> Ex. 2-Document: JONES-DOC-Mary_Jones,_Marriage_Certificate-1955
> Ex. 3-Histories & Reference: JONES-H&R-History_of_Mary_Jones-1997-pp_2-3
> Ex. 4-News: JONES-NEWS-Mary_Jones_Receives_25_Years_Service_Award-1990
> Ex. 5-Obituary: JONES-OBIT-Mary_Jones_Dies_of_Cancer-1998
> Ex. 6-Photographs: JONES-PHOTO-Mary_Jones_Family-1965

Documentation and Cataloging Images

Documentation and cataloging are important aspects of preservation and can often be combined in the same spreadsheet. They help confirm where the record/image came from, who created it, how it relates to records/images and its overall reliability.

Documentation takes time, but is critical in leaving a path for others to follow. When you think about putting images to the web, you focus on posting images and the overall sight design. Documentation will usually be an afterthought. If you, however, have made documentation a part of your preservation process, the addition of annotations/documentations should be a simple addition that will be greatly appreciated by other family historians as you share your research.

When you are cataloging images, you can use word processing (e.g., Word, Word Perfect), or a database program (e.g., Excel). Choose software that will allow you to easily share information with others. When you share the catalog be sure to save it as other file formats such as ASCII, Text in addition to the file formats of the software you are using. This will provide others the option of importing your database into the software they are using. Seven tips to remember:

> **1. Do it right the first time!** Whether the source is a newspaper, journal, court record, personal interview, letter, or church record, write everything down while you still have the source in your hands.
>
> **2. Sources you can rely on.** No one has a perfect memory, and some sources will have worse memories than others. The only source you can rely on is an "official" one; birth, marriage, death documents, and other confirmable databases and indices. Even if information came from a relative, list their name. You want to stay as accurate as is possible, and leave a clear trail for others to follow. Not only will you know you have proof of your information, but others you share the information with will know it is factual, not just speculation.

3. Sources establish credibility. Many genealogists responding to the survey pointed out that unless we are able to tell others where we obtain the information all we are sharing is our opinion. Citing sources is *essential* to establishing credibility. If we have done a good job with our research, we can give others the ability to broaden and build upon the research already done and not have the same work rechecked over and over again.

4. Write legibly. If you write any information, write legibly. It doesn't pay to hurry and then not be able to read your own hand writing later. When possible, try to always get a photocopy or a photo of the key information being captured and then enter it into the genealogical program or record database.

5. Checking sources allow for verification. Checking sources allows verification of spelling, dating, reporting variations, and leads to more information. Relying on the expertise of others helps save time and energy. Create and maintain a record of what resource was checked, so that you don't waste time later. Likewise, some sources (books, newspapers, etc.) might be found at only a few locations. Include where these were in case you need to glean them again.

6. How valuable is your time? Genealogists told experiences where they tried to pick up the trail of research from undocumented records and spent weeks, months, even years searching for the next clue only to find out the data entered was incorrect.

7. Six elements of a good source citation. The six elements of a good source citation include:
1. Author
2. Title
3. Publisher's name and location
4. Publication date
5. Location of the source and identifying information (library or archive where you found the information and its call number)
6. Specific information for the piece of data you found (page number, line number)

The following is an example of the documentation/cataloging format that I keep in Excel.

Database Index Organization
- **Column 1:** Surname
- **Column 2:** Disk location of file
- **Column 3:** Main folder/sub folder of file
- **Column 4:** Category
    a. Correspondence (COR)
    b. Documents (DOC)
    c. Histories and reference (H&R)
    d. News (NEWS)
    e. Obituary (OBIT)
    f. Photograph (PHOTO)
- **Column 5:** Individual (key person in photo)
- **Column 6:** File name

a. Ex. 1-Correspondence: JONES-COR-Mary_Jones
   _Writes_Barry_Ewell_on_Mission-2_Feb_1976
b. Ex. 2-Document: JONES-DOC-Mary_Jones_Marriage_Certificate-1955
c. Ex. 3-Histories & Reference: JONES-H&R-History_of_Mary_Jones-1997-pp2-3
d. Ex. 4-News: JONES-NEWS-Mary_Jones_Receives_25_Years_Service_Award-
   1990
e. Ex. 5-Obituary: JONES-OBIT-Mary_Jones_Dies_of_Cancer-1998
f. Ex. 6-Photographs: JONES-PHOTO-Mary_Jones_Family-1965

- **Column 7:** File description/notes (types of information to include in column.)
   a. **Correspondence (COR):** Who wrote to whom, date of letter, location of each
      person, content of letter, relationships of persons writing, number of pages, or
      lineage of person writing letter
   b. **Documents (DOC):** Type of document, key persons in document, key dates,
      source of document, or lineage of person
   c. **Histories and Reference (H&R):**
      History: Describe whom or what the history is about, include title of history,
      author, year of writing/publishing, details unique to history, collateral lines
      included in history, lineage of person, # of pages, and library call numbers
      Reference: Describe the reference document/book, why reference has been kept
      and how to be used, # of pages/page numbers, and library call numbers
   d. **News (NEWS):** Title of article, persons included in article, date of article,
      newspaper, page number, and lineage of person
   e. **Obituary (OBIT):** Title of article, persons included in article, date of article,
      newspaper, page number, and lineage of person
   f. **Photograph (PHOTO):** Names of persons in photo and position in photo, place
      of photo, date of photo, source of photo if appropriate, page # and book title if
      from book, lineage of main person (e.g., father if photo of family is taken, family
      member if person with friends)
- **Column 8:** Format Type (TIFF, JEPG)

Designing DVD/CD Covers

When I am storing and sharing images, I have chosen to use high quality media with inkjet
printable surfaces. The following is an example of my structure:

1. Keep it simple: Focus on being descriptive for easy identification when sharing with others.
   For example:
   a. Organize by year, surname, category
   b. Include photos of key ancestors, family members
   c. Main contents of DVD/CD
   d. Completion date
   e. Developed by

2. Tools of use:
   a. Used Epson Styles Photo Printer Software
   b. Printer was Epson Stylus Photo 220 (Prints on Inkjet printable DVDs/CDs)
   c. DVD Brand: Verbatim DVD-R

Requirements
1. A filename may contain any alphanumeric character, including the letters A to Z and numbers from 0 to 9.
2. The full filename (including drive letter, colon, backslashes, and folder names) may be as long as 255 characters.
3. The filename itself may be as short as one character.
4. The following special characters are allowed in a filename:
   - $ % - _ @ ~ ` ' ! ( ) ^ # & + , ; = . [ ] { }
   - Spaces are allowed in filenames.
5. The following special characters are prohibited from being part of a filename because they have special meanings to the operating system (DOS underlying Windows):
   - / \ | : * ? " < >
6. You'll get an error message if you try to use one of them.
7. Windows files (and Office files in particular) typically include a three-letter extension, which is added automatically by the program that created the file (such as .doc for files created by Word). However, an extension is not required, nor are extensions limited to three characters. Windows treats any characters following the last period in the filename as an extension.
8. When naming your files, use an underscore (_) or dash (-) instead of a space between words to prevent problems later if you post your pictures online. The reason to underscore, or use dashes and no spaces in a file name is to keep the file name from becoming a security threat where viruses, etc. can attach themselves. This is especially important if you don't have a good firewall software on your computer.

Suggestions
Although the above are requirements, they have a couple of recommendations or notes.
   Suggestions:
   - If possible limit the name of the file itself to about 40 characters so that you don't have trouble moving files with deeply nested folders.
   - If you use a nonstandard extension you may have difficulty opening the file from Windows. In Microsoft Office programs files with nonstandard extensions will not appear in file dialog boxes unless you change the file type to All Files.
   - Windows filenames are not case sensitive. MyFile.doc is treated the same as MYFILE.DOC and myfile.doc. However, if you are publishing to a web page, the web server may be using a different operating system that does pay attention to case.
   - Word marks temporary files with a beginning tilde (~) character. I would recommend not using this as the beginning character for any file that will be used by any of the MS Office programs.

Citing Resources

Examples of Citing Published Resources

The information is a mix of valid and fictitious data used as an example of documentation.

1. Book:
  a. **Author:** Michael E. Pollock
  b. **Title:** Bonds of Henrico County, Virginia, 1782-1853
  c. **Publication facts (place of publication, name of publisher, year):** Baltimore Maryland, Genealogical Publishing Co., Inc, 1984
  d. **Page number:** 133

   Formatted:
   Michael E. Pollock, Marriage Bonds of Henrico County, Virginia, 1782-1853, (Baltimore Maryland, Genealogical Publishing Co., Inc, 1984) p. 133.

2. Article:
  a. **Author:** E.E. Patton
  b. **Title of the article:** The Influence of the Huguenots
  c. **Name of Periodical:** The Huguenot
  d. **Publication facts (place of publication, name of publisher):** Vallejo, California, The Huguenot Society
  e. **Volume:** 10
  f. **Month/Season and Year**: 1939-41
  g. **Page Numbers:** 39-45

   Formatted:
   E.E. Patton, "The Influence of the Huguenots." The Huguenot (Vallejo, California, The Huguenot Society), Vol. 10 (1939-41), pp. 39-45.

3. Newspaper:
  a. **Title of article:** Maude Jolley Services
  b. **Place of publication:** Provo, Utah
  c. **Name of Newspaper:** Provo Daily Herald
  d. **Date of Publication:** 12 January 1929
  e. **Page number:** 1
  f. **Column Number:** 2

   Formatted:
   Maude Jolley Services, Provo, Utah, Provo Daily Herald, 12 January 1929, p. 1, column 2.

Examples of Citing Unpublished Sources
The information is a mix of valid and fictitious data used as an example of documentation.

1. Personal Letter
   a. **Author:** Mary Jones
   b. **Description of the Letter:** Letter to Barry Ewell
   c. **Date:** 23 February 1977
   d. **Detail:** Weekly letter from Mary Jones to Barry Ewell on mission in Munich, Germany. Topic of letter was trip to California.
   e. **Specific Location:** Original handwritten letter in possession of Barry Ewell
   f. **Form Used and Repository:** Hand written

   Formatted:
   Mary Jones, Letter to Barry Ewell, 23 February 1977, [Original handwritten letter in possession of Barry Ewell. Weekly Letter from Mary Jones to Barry Ewell on Mission in Munich, Germany. Topic of letter was trip to Utah.]

2. Oral Interview
   a. **Title of notes or tape:** Oral interview with James N. Ewell
   b. **Date of interview:** 21 October 2001
   c. **Interviewer:** Barry Ewell
   d. **Present Owner's name and address:** Recording owned by Barry Ewell, Riverton, Utah
   e. **Form used and location:** James Ewell was living in Mt. Pleasant, Utah
   f. **Place of Interview:** Beaver, Utah
   g. **Evaluation information:** Interview focused on experiences as policeman in Las Vegas, Nevada from 1968 to 1973

   Formatted:
   "Oral interview with James N. Ewell," 21 October 2001, by Barry Ewell, recording owned by Barry Ewell, Riverton, Utah, James Ewell was living in Mt. Pleasant, Utah, Interview took place in Beaver, Utah, interview focused on experiences as policeman in Las Vegas, Nevada from 1968 to 1973.

3. Photograph
   a. **Description:** Photograph of Francis Marion Ewell
   b. **Date of Picture:** Circa 1900
   c. **Location:** Spring City, Utah
   d. **Taken by:** George Edward Anderson
   e. **Specific Location:** Glass plates in possession of Brigham Young University, Provo, Utah

   Formatted:
   Photograph of Francis Marion Ewell, circa 1900, Spring City, Utah, taken by George Edward Anderson, glass plates in possession of Brigham Young University, Provo, Utah.

4. Unpublished Document
   a. **Descriptive Title of Document:** Personal History of John P. Jones
   b. **Significant dates or Numbers:** Written Circa 1935
   c. **Page Numbers or other Specific Designation:** Original owned by Daughters of Utah Pioneers, Spanish Fork, Utah
   d. **Other Detail:** 4-page history written by daughter Mary Jones Wright
   e. **Location and Form of Record:** Copy received and in possession of Barry Ewell, Riverton, Utah, 7 July 1997

   Formatted:
   "Personal History of John P. Jones," Circa 1935, 4 pages, written by daughter Mary Jones Wright, Copy received from Daughters of Utah Pioneers, Spanish Fork Utah, 7 July 1997, in the possession of Barry Ewell, Riverton, Utah.

Examples of Citing Official Records
The information is a mix of valid and fictitious data used as an example of documentation.

1. Vital Records
   a. **Descriptive Title of Record:** Certificate of Death
   b. **Individual:** James Neil Ewell
   c. **File # or other Descriptive:** 20-004
   d. **Significant Dates:** 8 January 2006
   e. **Location of the Record:** State of Utah—Department of Health
   f. **Location and Form of Record:** Certificate copy in possession of Barry Ewell, Riverton, Utah

   Formatted:
   Death certificate, James Neil Ewell, File No. 20-004, State of Utah—Department of Health, Certificate copy in possession of Barry Ewell, Riverton, Utah.

2. Census Record
   a. **Specific Descriptive Title:** 1920 United States Census
   b. **Civil Division:** Provo Ward 5, Utah, Utah
   c. **Page Numbers or other Specific Designation:** p. 251, family dwelling 223, 3rd West, Enumeration District No. 209, 10B, lines 96-100, 14 January 1920
   d. **Location and form of record:** Ancestry.com

   Formatted:
   1920 United States Census, Provo Ward 5, Utah, Utah, p. 251, family dwelling 223, 3rd West, Enumeration District No. 209, 10B, lines 96-100, 14 January 1920, Ancestry.com.

3. Legal Record
   a. **Descriptive Title:** Divorce of Ann Jones vs. Ricy D. Jones
   b. **Significant Dates:** 23 September 1974
   c. **Recorded:**
   d. **Specific Location of the Records:** Probate Court, Territory of Utah, Cache County, Logan City
   e. **Additional Detail/Description:**
   f. **Location and form of record:** Copy of the record in the possession of Barry J. Ewell, Riverton, Utah

   Formatted:
   "Divorce of Ann Jones vs. Ricy D. Jones," 23 September 1974, Probate Court, Territory of Utah, Cache County, Logan City, Copy of record in possession of Barry J. Ewell, Riverton, Utah.

4. Church Records
   a. **Description Title:** Baptismal Record
   b. **Individual:** Soren Nielsen
   c. **Significant Dates:** 27 Feb 1821
   d. **Specification Location:** Ringerike, Norway, Parish Records
   e. **Form used and Repository:** FHC Microfilm 0123956, p 185, number 8

   Formatted:
   "Baptismal Record of Soren Nielsen," 27 Feb 1821, Ringerike, Norway, Parish Records, FHC Microfilm 0123956, p 185, number 8.

5. Cemetery Records
   a. **Description Title:** Headstone Inscription
   b. **Individual:** Mary Jones
   c. **Significant Dates:** 3 Aug 1997
   d. **Specification Location:** Spanish Fork, Utah, Cemetery
   e. **Plot/Lot number:** Lot 242
   f. **Directions to Cemetery:**
   g. **Form used and Repository:** Barry Ewell Visit on 31 May 2002

   Formatted:
   Headstone inscription for Mary Jones, 3 Aug 1997, Lot 242, Spanish Fork, Utah Cemetery, (Located approximately 900 South 10th East), Barry Ewell Visit on May 31, 2002.

Examples of Citing Online Sources

The information is a mix of valid and fictitious data used as an example of documentation.

Note: When possible I include a URL/Address plus a physical address because email addresses tend to change.

1. Scanned Image File
    a.   **Description:** Birth Certificate
    b.   **Individual:** Mary Jones
    c.   **Details:** Certificate # 345-289
    d.   **Date:** 18 Oct 1933
    e.   **Location:** Spanish Fork, Utah
    f.   **Scan Date:** 24 Nov 2005
    g.   **Image File Name:** JONES-Mary Jones Birth Certificate.tif
    h.   **Scanned by:** Barry Ewell, bj57barry@msn.com, Riverton, Utah
    i.   **Address of person who scanned:**
    j.   **Image Editing:** Digitally retouched by Barry Ewell, Riverton, Utah, January 2006 to provide color correction to faded document. Data was not changed.

Formatted:

Birth certificate of Mary Jones, Spanish Fork, Utah County, Utah, Certificate # 345-289, 18 Oct 1933, Image File: JONES-Mary Jones Birth Certificate.tif, scanned by Barry Ewell, [bj57barry@msn.com, Riverton, Utah], 20 November 2005, [Image has been digitally retouched by Barry Ewell, Riverton, Utah, January 2006 to provide color correction to faded document. Data was not changed.]

2. Email Message
    a.   **Author:** Igor Pleve
    b.   **Email Address:** igor@mt.ixu.ru
    c.   **Message Title**: 1857 Schondorf Census-Wagner Surname
    d.   **Description of Email:** Message to Barry Ewell
    e.   **Date:** 6 April 2004
    f.   **Specific Location:** Electronic file in possession of Barry Ewell
    g.   **Detail:** Description of 1857 Census, Schondorf, Russia with Wagner Surname
    h.   **Form Used and Repository:** Located in Wagner Surname Folder, Igor Pleve Correspondence, File Name Igor Pleve-1857 Shondorf Census-Wagner Surname

Formatted:

Igor Pleve, [igor@mt.ixu.ru], "1857 Shondorf Census-Wagner Surname," Message to Barry Ewell, 6 April 2004, Electronic file in possession of Barry Ewell, [Description of 1857 Census, Schondorf, Russia with Wagner Surname, Located in Wagner Surname Folder>Igor Pleve Correspondence>File Name Igor Pleve-1857 Shondorf Census-Wagner Surname.]

3. Message Board:
   a. **Author:** George Wright
   b. **Email address:** gwabc97@gmail.net
   c. **Message Title**: John Mullins 1789 White Hall, Virginia
   d. **Date:** 23 March 2006
   e. **Message URL:** http://www.genealogy.com/genealogy/17_after.html?priority=0001000
   f. **Description:** John Mullins family in Whitehall, Albemarle County, Virginia. Lineage of family and children from 1750 to 1804
   g. **Form Used and Repository:** Copy downloaded and in the possession of Barry Ewell, Located in Mullins surname Folder>Message Board-Mullins>John Mullins 1750-1804

Formatted:

George Wright, [gwabc97@gmail.net], John Mullins 1789 White Hall, Virginia, 23 March 2006, [http://www.genealogy.com/genealogy/17_after.html?priority=000100], John Mullins family in Whitehall, Albemarle County, Virginia. Lineage of family and children from 1750 to 1804], Copy downloaded and in the possession of Barry Ewell, Located in Mullins Surname Folder>Message Board-Mullins>John Mullins 1750-1804.

4. Web Site File
   a. **Description:** Ewell Family Organization
   b. **Individual:** Family line of Francis Marion Ewell
   c. **Website Address:** http://www.ewellfamily.org/
   d. **Date**: 29 June 2006
   e. **Detail:** Downloaded Franklin Marion Ewell Gedcom. Reviewed data and includes detail and sources. Compiled by Ginger Hall
   f. **Form Used and Repository:** Copy in the possession of Barry Ewell, Located in Ewell Surname Folder>Gedcoms,>Francis Marion Ewell

Formatted:

Family line of Francis Marion Ewell, Ewell Family Organization, <http://www.ewellfamily.org/>, June 29, 2006, [Downloaded Franklin Marion Ewell Gedcom. Reviewed data and includes detail and sources. Compiled by Ginger Hall], Copy in the possession of Barry Ewell, Located in Ewell Surname Folder>Gedcoms,>Francis Marion Ewell.

Digital Photography Images

The digital camera has been the most flexible and important tool to capture digital images. As I have sought to learn about my ancestors, I've been fortunate to travel to some of the areas where my ancestors lived and have had the opportunity to do on-site research. These experiences have ranged from half-day excursions to a month long stay.   I use the camera about 90% indoors and 10% outdoors.

Common Places Indoors
1. Libraries
2. Courthouses
3. Museums
4. Historical societies
5. Homes
6. Family reunions
7. Other places where documents and pictures are

Types of indoor projects
1. Text, existing photographs, or other images.
2. Some will be black and white; some grayscale and some will be in color.
3. Some will be in books, some will be unbound.
4. Some will be old and brittle or so fragile that they are stored and viewed in a room where they won't let the light of day in.

Outdoors: 10-plus percent
1. Cemeteries.
2. Land or buildings where family members once lived, worked or worshipped.
3. Many outdoor shots are of historical consequence, but not of genealogical substance.

Digital Camera Buying Tips

Are you ready to buy a digital camera? Recommendations for specifications will fit the needs of most genealogists.

1. Match megapixels to your use. Most point-and-shoot cameras offer at least 4 megapixels, which is plenty for producing 8-by-10-inch prints. Cameras with more megapixels will yield even larger prints and allow you to blow up a part of an image with less likelihood that the print will be blurry. If you plan to make only 4-by-6-inch prints, you don't have to shoot at the camera's highest resolution--and as a result, you can fit more shots on your memory card.

2. Look for rechargeable batteries and a charger. The cost of disposable batteries adds up over the long run. Some cameras can use AA batteries of any type--disposable or rechargeable. That capability can be helpful if your rechargeable batteries run out of juice and you don't want to wait while they replenish.

3. Get at least 3X optical zoom. Most cameras offer digital zoom in addition to optical zoom--and sometimes vendors combine the two specs to tout a high total zoom. But digital zoom results in photos that aren't nearly as good as those produced with an optical zoom.

4. Look for a low-light focusing aid. Some cameras have auxiliary lights that help them focus in dim settings. That's important for many indoor shots.

5. Try the camera before you buy. Some cameras have commands and menus that are easier to use than others, a comparison you can make only with a hands-on trial. Also evaluate the lag time between when you press the shutter button and when the camera actually takes the picture. Try the zoom lens--does it operate quickly and smoothly? Find out how long you must wait between taking pictures. And try the LCD viewfinder--in the sun if possible--to determine how easy it is to read.

6. Give extra consideration to a camera with a good selection of software. Look for useful packages like Adobe Photoshop Elements and Ulead Photo Impact for editing images, as well as applications for sharing them.

7. Don't base your decision on video capability. Any still camera's ability to take moving pictures is limited. If you want to shoot video, invest in a camera dedicated to the job.

8. Consider investing in a memory card reader. These readers act like an external hard drive attached to your PC or laptop, allowing you to download pictures directly from the storage media your camera uses. Many newer laptops have one or more memory card slots built in, as do some inkjet printers. If you have a second memory card, you can keep shooting while the images download, rather than having to keep the camera hooked up to your PC.

Digital Camera Transfer Options
There are several ways to transfer photos, and they're all relatively simple.

- **USB cable**. Connect your camera directly to any PC or printer. Since newer products have USB ports, you can transfer photos to nearly any computer or printer with ease.

- **Memory card**. Remove the memory card from your camera and insert it into a card slot on your printer or a card reader on your PC. Its small size and portability make the memory card great for on-the-go printing.

- **Camera dock:** Set your camera in this device and transfer photos to your PC with the press of a button. The dock also charges your camera's rechargeable batteries, and connects to a TV for slideshows

- **Bluetooth:** Send photos wirelessly from a Bluetooth-enabled device (such as a camera phone or handheld) to an enabled PC or printer. No cables or components are needed!

- **Using photo-editing software**. If you'd like to transfer photos to your PC, you can download them to photo-editing software where you can edit and manage the images.

A Word on Memory Cards. Additional memory cards allow you to take more pictures before you have to transfer images to your computer. This way, you can increase your chances of capturing the perfect angle, just the right light, or the most revealing, candid moment.

To make sure you don't miss a thing, digital memory cards offer high storage capacity (from 64MB up to 1G-plus) in a product the size of a postage stamp. Keep one on hand for an extended trip or vacation, or for those times when you just need to free up space on your camera.

This chart shows you how many photos you can store on your camera's memory card if your camera's image quality is set on the default setting (usually better) creating a .jpg image. The actual number of photos will vary depending on which camera you have, image quality settings, and how detailed the photos are.

Memory Cards and Megapixels

Camera Mega pixels	Number of images that fit on a 64MB memory card	Number of images that fit on a 128MB memory card	Number of images that fit on a 256MB memory card	Number of images that fit on a 512MB memory card	Number of images that fit on a 1GB memory card
4MP	40–50	91–100	171–189	362–400	724–800
5MP	35–40	70–78	141–157	283–313	565–625
6MP	27–32	57–63	113–125	226–250	452–500
8MP	20–23	38–42	75–83	151–167	301–333

Protecting Your Photos on Secure Media.
Backup to Harddrive. Once you're back home, take the time to transfer and back up your digital images. I have on more than one occasion been grateful that I took the time to transfer and backup my photos. My normal mode of transfer is simply to down load the photos to a file in my pictures folder and name something like "Barry Transfer_ (Name of Shoot)_ (Date of transfer-Day/Month/Year such as--041207) and then I backup the file to a secondary harddrive. And then within a few days I will bring the photos into my photo editing software to sort, delete, edit, name, and file.

Backup to CD/DVD. If you desire more security or don't have a backup drive, you can backup your images to a CD/DVD. For the average photographer the best medium for backup is a CD.

If you're using Windows XP, it's easy to back up your photos to a CD.
1. Open the folder that contains your photos. You will want to work with the Picture Tasks area on the left side of the window. If you don't see the Picture Tasks area, click on

Tools, then Folder Options. Under the General tab, select "Show common tasks in folders," then click OK.

2. Highlight the pictures that you want to backup by holding down the CTRL key and clicking on the ones you want to choose.
3. Then click "Copy all items to CD" in the Picture Tasks area.
4. A balloon saying, "You have files waiting to be written to the CD" will appear in the bottom right corner of your screen.
5. Click the balloon message to see the files.
6. Then click on "Write these files to CD" in the CD Writing Tasks area on the left.
7. A wizard will appear that will walk you though the simple process of burning a copy of your pictures to a CD.
8. At the end of the process, the wizard will even ask if you would like to make another copy of the CD. This may be a good idea.
9. To make sure your photos are really safe you can make an extra copy to leave with a friend or neighbor.

If you don't have Windows XP but you have a CD writer you can archive your photos by using the program that came with your CD writer.

Online Storage. You can also use a photo website like Shutterfly http://www.shutterfly.com/ and Kodak Easyshare Gallery http://www.kodakgallery.com/ to store a copy of your photos. Two important things to remember. 1. Remember you have them there and make sure you make a backup to Hard drive or CD/DVD. 2. Remember that if the website goes out of business, you are out of luck with no recourse to find your images.

Why Do I Like Certain Photographs?
If you're like me, photographs decorate my home and office. Photographs are part of every medium we consume from books and magazines to newspapers and calendars. Pictures communicate our thoughts and feelings. Within genealogy, the photo is used to document our sources and provide depth to our family history as we record and tell our history. The only boundaries are within your mind.

Have you every thought about why you like certain photographs? The answers are relatively simple and you can improve your images by following a few basic rules which you will use a majority of time.

Rule 1: Get in Closer. Real Close
Get in as close as possible, thereby eliminating anything in the background that may detract from your subject. For example, when you are taking photographs of flowers, focus in on one flower. Get as close as you can get so that you can see nothing more than the pedals of that one flower.

Look around your room, there are many pictures that are waiting to be taken. Perhaps it's the a child's toy on the floor, stack of papers on your desk, the antique wooden table, or books on the shelf. Always ask yourself whether you are emphasizing the things you really want in the photograph.

Practice Example 1: Set your camera up on a tripod, get as close as you can to a flower, while still keeping the flower in focus. You may choose to include some of the greenery or vase, but make sure you are getting rid of all other images in the photo which cause "clutter." If you can

move the clutter, move it physically taking away or moving the lens so it is no longer in the photo. The image you now see should fill 90-plus percent of the rectangle you see in your viewfinder/LCD display. You should be seeing nothing but the flower's petals, with enough detail you feel you could reach out and touch them. The light hits the blossom just right, creating just enough shadow to make each petal stand out from the others, and you get lost in the beautiful swirl and curves and there is no distraction.

Practice Example 2: With the same setup as in example 1, ask a family member or friend to simply sit in a chair why you take close-ups of their face. As you get close, don't be afraid to crop out potions of the head and face. Focus on the eyes and smile.

Shooting close, really works.

Rule 2: Photographic Composition
One of the first photographic lessons I learned is there are "sweet spots," places in the rectangle of the photo where placement of the main subject of the photo will make the photo really pleasing to the eye. This is called composition.
Our first instinct is to want to place the focus of our picture right in the middle. Another term for that is called "bullseye." From now on forget about centering your subjects. You will notice a difference in your photos immediately. There are several methods you can use to help you compose your pictures betters.

> **Squint.** Yes, I'm serious. Squint your eyes until the image is almost a blur. At this point you will see the lines and shapes created by the shadows and light. You will notice how shadows blend together creating shapes and forms that you would not have seen otherwise. It will impact the composition of your picture.

> **The Rule of Thirds and the Golden Mean.** Any image can be divided into nine equal parts by two equally-spaced horizontal lines and two equally-spaced vertical lines (i.e., Tic-tac-toe board.) The four points formed by the intersections of these lines can be used to align features in the photograph which is called the "Golden Mean." I am a firm believer that aligning the photo at these points of intersection creates photos of more interest and energy. Photos are simply more aesthetically pleasing.

> For example, when you are talking outdoor shots, place the horizon in the top-third. Rather than placing people in the center, put them on the right or left third of the photo.

> **The Golden Triangle.** The Golden Triangle Rule is a spin-off of the Rule of thirds. To follow the rule, simply draw a diagonal line connecting two opposite ends of the picture. Then draw connecting lines from the two unused ends so that they are parallel to the first diagonal line. At the two points where the lines intersect, that's where your subject should be. The idea behind this is that keeping the composition in a diagonal line defies the logical straight line that our brain is used to seeing, making the overall composition a lot more intriguing than a simple shot of the subject bang in the center.

Odd Numbers. Photos stand out when they move away from the element of order and symmetry. Even numbers of objects make an image look simple because it immediately brings out a sense of symmetry. Take a photo two similar objects and then take the same photo with three objects. Notice the lack of symmetry, making the image more appealing to look at. This rule works really well with people, birds, animals, flowers, inanimate objects, and just about anything you can think of.

The Frame Within A Frame. This rule works well with architecture and landscapes. Use materials near you in the foreground and include them in your photograph around two or more edges to create a frame. Archways, doorways and other such features work well.

Leading Lines. Roads and footpaths are a great way to use leading lines to your advantage and draw your viewer into your photograph. When looking at a picture, our eyes look for a pattern or a lead-in to the subject. That's where lines can be highly effective in any composition. When our eyes spot a line in a composition, they automatically follow it from the edge of the frame to wherever it may lead.   For example a painted line on the road leads your eye into the image, meeting the horizon line, which is one third of the way down into the image. The edges of the petals of a daisy can be leading lines moving into the center of the flower. A row of trees or street lights that vanish in the distance can create very strong leading lines that take the viewer's eye all the way through an image.

The Circle. The circle can be used very effectively when composing a photograph, if the subject is right. The circle keeps the viewer's eye from escaping from the picture, taking the viewer's attention such as in the center of a dartboard. "The Circle" is a tricky element to use in a photograph effectively, but when done well, makes for an outstanding photograph.

Rhythm. Dynamic impact in your photograph is created by using "visual rhythm." This is a way to use repetition of form and shape in an image to create interest.

Negative Space. Negative space is a term used in photography that implies only a tiny fraction of the frame is taken up by the actual subject. Negative space is usually used either to make the subject seem very small, or to give the impression of the subject being in a wide-open space.

It's Ok to Break the Rules. Sometimes your subject just doesn't fit into any of the composition rules. What do you do? Take the picture the way it looks best.

Taking Better Digital Photos: Overall Tips
The following are some basic tips to consider the next time you head out with your digital camera. These tips are easy to implement and make the biggest difference in your use of the camera in genealogy research.

Be prepared. Gather everything you'll need, such as a tripod, extra batteries, and any props you'll use. (A camera bag really comes in handy for transporting everything.) If you plan to take photos in wet weather, bring a plastic bag to protect your camera.

Hold your camera steady. Camera movement causes most of the blurry pictures you see. Prevent your camera from shaking by planting your feet firmly on the ground, and then steady your upper body by tucking your elbows in close to your sides. If you feel unstable, use a tripod or try leaning against a wall or a tree. Gently press the shutter release in one motion; if you press too hard, you could jerk the camera downward.

Get closer. Try to get within two to four feet of your subject. Ideal photo composition is 90 percent subject and 10 percent background. If you're photographing people, getting this cozy might seem awkward at first, but try it anyway—you'll get better photographs.

Cut the clutter. Nothing ruins a photo like stray objects that detract from your composition. If there's a phone wire, an aluminum can, or anything else unsightly, remove it from view by either rearranging the area or blocking it out of the frame. Also, notice how objects in your background interact with your subject. A plant that appears as if it's growing out of someone's head, for example, will ruin an otherwise great picture.

Take more pictures. Most of us are frugal with the number of pictures we take. But with a digital camera, you can simply delete the images you don't like, so don't hesitate to capture every memory. Why not fill the entire memory card with photos of your new puppy? The odds are better that you'll take a few pictures that will really thrill you.

Find the right lighting. Use the flash sparingly, especially when photographing people. Natural light, such as the light coming in from a window, provides a more flattering tone and a higher-quality photo. For a dramatic effect, experiment with shadows created by natural light.

Another way to improve a picture's lighting is to use HP adaptive lighting technology. You'll achieve a better balance between light and dark areas, bringing details out of shadows. As a result, your photos will look more like what your eye sees.

Remove red eyes. There are a few factors that cause people to have glowing eyes in photos, including the amount of pigment in their eyes. While red-eye isn't 100% preventable, you can take measures to avoid it.
- Snap pictures when your subjects aren't looking directly at you.
- Avoid using the flash whenever possible.
- If you decide to use the flash, turn on the red-eye reduction flash on your HP camera.

Try a new angle. Get creative by using different angles. Get down on the ground or up on a chair, and look at your subject from a different perspective. Take time to find the best viewpoint and take several shots of the same subject from various angles.

Don't say cheese. Sometimes you want a perfectly posed picture, such as a portrait of the kids with their grandparents. But you don't need to pose your subjects every time. Part of the beauty of digital photography is that it's much easier to capture life's candid moments. So forget "cheese" and tell a joke or two! Your subjects will look relaxed and natural, allowing for pictures with more personality.

Avoid the bull's-eye effect. There's nothing wrong with placing your subject in the exact center of the frame, but there's nothing particularly interesting about it either. It's actually more aesthetically pleasing to place your subject off center than mid-frame. In photography there is a what is a called the "rule of thirds," a trusted compositional technique. Here's how it works: In your mind's eye, divide the picture area into vertical and horizontal thirds (like a tic-tac-toe grid).

Rather than placing your subject directly in the center of the grid, try placing it on one of the four lines to create a more interesting picture. You might line up a human subject on line A or line B, for example. Or in a landscape photo, you could experiment by aligning the mountains or horizon on line 1 or 2. Use the rule of thirds to create a picture with a more dramatic sense of scale.

Taking Better Digital Photos: Close-up
With close-up photography, familiar objects become unusual and abstract … and unusual objects become even more fascinating. Whether you want to capture flowers or ripples in a pool of water, close-up photography reveals details the eye tends to take for granted. All you need is a digital camera, curiosity about the world around you, a sense of adventure, and a handful of tips and techniques.

Depth of field. Since many digital cameras are able to get within an inch of your subject, they're ideal for taking close-ups. But you'll notice that very few close-up photos are completely sharp from foreground to background. That's because when the camera is really close, your depth of field (the sharp, in-focus part an image) is shorter, which can make focusing on your subject a challenge.

Aperture and shutter speeds. To understand depth of field, it helps to understand the basics of aperture and shutter speeds. When your shutter speed or aperture changes, your depth of field is altered.

Aperture is the size of the opening that allows light in. The numbers on the aperture control are called f-stops (f16, f11, f8, and so on). The larger the f-stop number, the smaller the opening. You can use a lower f-number to blur the background and a higher f-number for more depth of field. Shutter speed is how long the shutter stays open; measured in seconds, it controls the amount of time that light is allowed in. (A common shutter speed for photos taken in sunlight is 1/125 of a second.) Very short shutter speeds are used to freeze moving subjects. Very long shutter speeds are used in low-light conditions (like at night) or to blur a moving subject.

Aperture and shutter settings work together. And they can be used in different combinations to produce the same exposure.

Using depth of field for effect. You could use a shallow depth of field to your advantage to make a small object stand out sharply against a blurred background. For example, you can have a very narrow focus on just one thing, like a flower, and throw the background and surroundings out of focus.
Or you can try to focus on several things at once, like a spider capturing prey in its web. Then you might want to have the sharpest focus on the spider, but make sure the prey in the foreground or background is reasonably sharp.

Positioning your camera. To deal with shallow depth of field, it's especially important to position your camera parallel to the plane on which you are focusing. If you're shooting an insect resting at an angle on a blade of grass, line up your camera with the body of the insect—rather than looking at it from an angle—or only part of it will be in focus. (Essentially, the back of your camera should be parallel to your subject.)
If you can't get the entire subject in focus, decide what you want to center on, and make sure it's parallel to the back of the camera.

Lighting and exposure. The challenge in lighting close-ups is having enough light so your camera can focus. You can increase depth of field by increasing the illumination of the subject to narrow the aperture. Using a flash, for example, gives you better depth of field. And the extremely short bursts of light at close distances prevent subject movement from blurring. The flash also helps to stop any movement.
But sometimes a flash will change the photo's color or cause an overexposure because it's too close to the subject. In these cases, it is best to provide another source of light. Get creative. Use aluminum-wrapped cardboard or mirrors, or, if you're inside, try different household lamps.

Freedom to experiment. Close-up photography is just the beginning of where your newfound knowledge of exposure and shutter speeds can take you. Read a book on night photography and capture the stars in the sky or the city lights. Or experiment blurring and freezing motion shots. Before long, you'll begin to intuitively know how to find the perfect exposure and just the right lighting. Get a little practice with outdoor photography to learn more.

Taking Better Digital Photos: Family Portraits

Position people artistically. Grouping subjects together in interesting and fun arrangements makes for memorable photos. Also allow everyone to get comfortable before you start shooting. Waiting for them to talk or tell a story can do the trick. If shooting a big group, consider creating two or three small clusters of people within the frame. A couple of loose groupings of three people each works well.

Choose the right clothes. Have your subjects dress in clothes that work well together— such as pieces in the same color palette—but are not the same. Subtle patterns can add interest to the shot.

Fill the frame. Don't let your photo be ruined by a cluttered background. Zoom in to ensure your family takes up the full picture frame. Cropping in close will also produce a photo that shows great detail on people's faces.

Shoot subjects at eye level. Positioning your camera at or slightly below your subjects' eye level will create a more personal photo.

Try extreme angles. Take family photos from interesting vantage points to create images that surprise and please the eye.

Get close up. Use your HP camera's Macro mode to fill the camera's viewfinder and explore the finer details of your loved-ones' faces. Check the manual for your camera's closest focusing distance.

Taking Better Digital Photos: Outdoors

Light it right. Using light to your advantage is what separates good photos from great ones. The best times to take pictures are usually early morning and early evening; the worst time is generally midday, when light is most harsh.

Let your camera be your guide. Many digital cameras have technology that allows you to create pictures that look more like what you see with your own eyes. It balances brightness, preserves contrasts, and ensures details aren't lost.

Digital camera's white balance can help make photos look more realistic no matter what type of light you're in. Sun, shadow, dawn, dusk—digital cameras with this breakthrough technology will automatically find the right setting for each shot.

Nature up close. Perfect for shooting flowers, butterflies, and other aspects of the great outdoors, close-up photography reveals details the naked eye can't see. Close-ups isolate the subject from surrounding clutter. Learn more about close-up photography.

Digital cameras with a macro shooting mode are great for taking close-up images when the focal point is very tight on the center of the subject. The camera automatically adjusts the aperture and shutter speed so that the subject will be sharper and clearer. This takes the background and foreground out of focus, so you can capture a single flower, leaf, or ladybug with crystal clarity.

Faraway views. Once you've mastered close-up shots of the natural world, broaden your horizons with wide-format pictures. Many cameras include an automatic landscape shooting mode so you can capture scenes with deep perspective, and keep the foreground and background in focus.

Mountain ranges, desert plateaus, and the ocean at sunset also provide amazing opportunities for memorable panoramic images. To make your photos unique, be sure to position a person, animal, or unusual landscape feature in the foreground of your photo.

In-camera panorama preview lets you see an outline from your first shot on the LCD so you can precisely line up the second shot. In-camera stitching combines up to five photos that can be reviewed on the LCD so you can see the whole panoramic picture. When downloaded to your PC, the pictures are easily stitched together to create a final, seamless panorama photo.

Going abstract. Abstract photography is about capturing color, shape, and pattern to create an intense visual experience for the viewer. Begin with subjects that lend themselves to abstraction: leaves and water reflections, for example. Seek out interesting patterns and textures in tree branches and leaves. Objects you've never considered photographing will suddenly seem like prime subjects.
You can always use image-editing software to create unique effects in your photograph.

Art show. There are so many creative ways to use your outdoor photos. Frame two or three images together as a series. Or save your favorites in a photo journal. Not only is a journal a great way to collect your best shots, but you can use it for practical purposes too, like recording plantings so you don't forget what will bloom where.

Taking Better Digital Photos: Travel

You don't have to travel far to find fascinating nature and wildlife … just head into your backyard and look around. No matter where you live, outdoor photography will help you look at your world with new eyes—and improve your photo-taking skills, too.

Prepare for take-off. Before your trip, review travel guides and photos in books and magazines so you can make a list of potential shots ahead of time. When you reach a photo location, scout the area to plan your approach before shooting.

The right lighting is crucial to creating stunning photos. Consider the best time of day for your desired shot. For example, if you must have a photo of the Eiffel Tower while in Paris, shoot just before sunset or shortly after sunrise. The light during this time can lend everything a beautiful golden hue.

Compose your shots carefully. Keep composition in mind, too. You'll want your subject to fill the frame; ideal composition is 90 percent subject and 10 percent background. Try to get within two to four feet of your subjects, and avoid the urge to always center them. Off-center subjects tend to make photos more interesting.

Before you shoot, make sure there are no stray objects that might detract from your composition. If you see a piece of trash or a phone wire, remove it from view. And pay attention to how background objects interact with your subject. A castle spire that looks like a hat or horn on your subject's head can ruin an otherwise great photo.

Discover more ways to improve your photographic skills in Take better photos: part one and Take better photos: part two.

Try something new. A few posed travel photos are fine, but remember to take spontaneous shots of your traveling companions enjoying the moment and interacting, too. A picture of friends laughing and eating gelato in North Beach is more poignant than a photo of them standing stiffly in front of the Golden Gate Bridge.

Your photos should tell a story. Eating, relaxing, leaning on street signs, and browsing roadside markets are part of the adventure. And remember, you're using a digital camera, so snap as many pictures as you like! Just delete those you don't want to keep. (Remember to pack an extra memory card.)

Experiment with shooting modes. A trip is the perfect time to try using the special shooting modes on your HP camera. For example, beach mode helps you capture bright seaside scenes with well-balanced highlights and shadows. And you can discreetly shoot pictures indoors with no flash or sound when you use museum mode.

Capture a grand landscape or large group shot by using the HP in-camera panorama mode and in-camera panorama preview option, which allows you to seamlessly stitch together

up to five images. This ingenious feature makes it easy to line up each photo in sequence as you shoot.

Get a fresh perspective. Try to get an unusual or interesting view of familiar sites. Crouch or lie down and shoot upward to exaggerate the height of Seattle's Space Needle. Zoom in on a single statue in the Trevi Fountain, or shoot a picture of the Grand Canyon from an airplane window.

Give your photo more depth by surrounding the subject with windows, arches, or other framing devices. Or explore some more abstract views. Close-ups are a great way to create an appealing photo full of pattern and texture. Learn more about capturing close-ups.

Include people. People give your photos personality. But how do you photograph the strangers you encounter as you travel?

Try to establish friendly communication with the person you want to photograph: Chat with the fruit vendor in Genoa or buy a bag of lemons from her. Learn how to ask for permission to take a photo in the native language, or simply smile and raise your camera. Wait for a nod or other positive sign. If you get a disapproving look, seek out a more willing subject.

Be creative. Turn a trip into a voyage of discovery by keeping a travel diary, the perfect complement to your travel photos. Include descriptions of food, people, and scenery, and jot down comments made by companions and strangers. Add neighborhood maps, sketches of surroundings, ticket stubs, brochures, and other memorabilia.
When you use your photos to create albums, slideshows, websites, and other projects, incorporate memories from your journal.

Save and share your photos. Also, make sure you save your photos somewhere besides your camera's memory card. Learn how to create a digital archive by preserving photos on DVD upon your return home.

Wet-weather Photography
Bad weather doesn't mean bad pictures. It just changes your options and sets the stage for some unique photographic opportunities. In fact, rain can be a photographer's friend, intensifying colors and adding drama to just about any subject. These tips will help you get the most out of wet-weather photo shoots.

Taking the plunge.   Before you put on your rain gear and embrace the elements, follow these tips:
- Always keep your camera inside your jacket or sweater to protect it during a downpour.
- For added protection, use a plastic bag to waterproof your camera. Just cut a hole for your lens to poke through.
- Keep a soft, clean cloth handy to wipe water droplets off the lens. Don't use a tissue directly on the lens.
- Consider getting a waterproof case for your camera.

Gray skies, great photos. Overcast skies can be used to your advantage. Color contrasts are muted on a gray day, and colors seem richer—creating the perfect setting for photos of trees and plants. And fog can subdue colors and soften objects in the background, making a lake or your neighborhood park look ethereal and mysterious.

Digital cameras feature special shooting modes that adjust for lighting (i.e., beach, snow) and situation (i.e., macro for close-ups, portrait). Experiment with the action mode to freeze raindrops hitting a puddle, or a car's speeding tires flinging water. You can also capture wet scenes beautifully with black-and-white photography.

After the storm. Storms and heavy rain intensify an image. A particularly good time for dramatic landscape pictures is right after a storm: the sun is beginning to break through, and billowing clouds can be seen in the distance. This combination of bright sun and dark skies creates an extraordinary backdrop: colors seem deeper, and objects glisten under the emerging rays of light.

To capture it all, try using the landscape shooting mode on your camera—it provides great range and sharpness.

Capture a rainbow. Rainbows always make stunning subjects. They're formed by the refraction of light through raindrops, and you'll usually find these conditions before or after a summer storm. Act fast when you see a rainbow—a storm can recede quickly, and the moisture that creates rainbows can vanish in an instant. Rainbow photos are especially striking with other dominant objects in the frame, such as a mountain, body of water, or other natural feature.

Portrait in a puddle. And what about the water at your feet? Think of all the interesting reflections you can capture in a puddle: trees, clouds, city lights. Include surroundings in the shot, too, like the soccer field and bleachers that the puddle reflects. And puddles attract kids like magnets—a great opportunity for candid shots and another reason to keep your digital camera handy.

Digital Camera Checklist for Research

1. Digital Camera with Built-in Flash
a.   Two extra sets of rechargeable batteries.
b.   At least 512 M of removable storage.
  * I carry 3 gig of storage with me. About 3,000 photos JPG format.
  * I have had disks that were full which I forgot to clean off or have failed.
c.   Electric charger for rechargeable batteries.
d.   Transfer cord that links from camera to computer.
e.   Car charger with 1 or more plug outlets.
f.   Camera stand.
g.   Carrying case.
h.   Camera manual.
i.   Tripod.
j.   Copy stand (cookie sheet with markings) and extra strip magnets to perform indoor shooting will provide consistent results.

2. Laptop with DVD/CD Burner
a.   External hard-drive to transfer large amounts of data.
b.   Electrical cord.
c.   Time to build electronic folders for transfer before you leave on trip.
d.   Make sure the loaded software includes:
  * Choice of family history software and needed family files.
  * Word processing software.
  * Digital camera utility software needed to transfer images from.
e.   Carrying case.
f.   Backup disks of favorite software in case you need to reinstall software while on the road.

3. Cell Phone with Key Call Numbers Stored into Database/Memory
a.   Rechargeable cord.
b.   Ear phone cord.
c.   Extra phone cord.
d.   Extension cord from phone to computer if you use your phone to connect to internet in emergency cases.

4. Scanner/Camera Support Software
a.   Scanner support software.
b.   Photo/image editing software.
c.   Internet software to connect to email, etc.
d.   DVD/CD burning software.
e.   Carrying case.

Note: Do not take a scanner when traveling via airplane.   The scanner will be banged up in transit. If you need a scanner on a trip when you are taking a plane, consider buying a low-end model once you get there for under $100.00 and leaving it behind as a gift when you come home.

5. Audio Micro Cassette Recorder to Record Thoughts or Interview Persons
a.   5 to 10 hours of blank tapes.

6. Research Folder
a. Goals and objectives for trip.
    - Acquisition goals.
    - Travel plan and approximate times for each phase of research.
b. Appointment calendar.
c. City, county, state maps.
d. Key contacts, address, phone numbers.
e. "Mapquest" maps of destination.
f. Internet printouts that include address, phone numbers.
g. Library, historical society, city offices, etc.
h. Printouts from catalogs of key documents you seek to view/film.
i. Internet printout of things to see.
j. Packing list so you can recheck what you brought and not leave anything behind.

7. Scanner
a. Electrical cord.
b. Cord for transferring images from scanner to computer.
c. Note: When researching in courthouses and libraries keep the computer and scanning equipment stowed safely in the car in a large insulated lock box and only bring them in if needed.

8. Necessary Clothes
a. Extra pair of old shoes for muddy, cow occupied fields.
b. Long pants to protect legs from tall grass, briars, and climbing fences.
c. Extra clothing for when you get wet or soiled.
d. Hat to protect from the sun.
e. Sun glasses when you are outdoors.
f. Bug repellent.

9. Emergency Food for When You Can't Leave the Research Work
a. Energy Bar.
b. Water.
c. $5 -$10 for meals.

10. Larger Padded Carrying Case
a. To secure equipment that doesn't require protection.

11. Hard-shelled Suitcase
a. To protect camera and other digital equipment in their own bags.

12. Mapping Program
a. Example: Hardware in combination with its Street Atlas USA mapping software to take advantage of the Global Positioning System (GPS). Especially when you're going to multiple places over several days that may be hard to find. Rent or have a GPS system installed in vehicle such as Neverlost.
b. This is extremely helpful when finding cemeteries as well as other locations of genealogical interest.

13. Extra Notes
a.   Note: Check all equipment upon arrival if you are staying long term.
b.   Charge all equipment before you leave.
c.   Clean removable storage disks.

14. Miscellaneous
a.   Envelopes in which to put removable camera storage and cassettes.
b.   Note pads.
c.   3 Pencils w/sharpener or 2 mechanical pencils with extra lead.
d.   3 pens.
e.   Electrical bar strip with at least 4 outlets.
f.   Camera cleaning kit.
g.   Extra DVDs (large storage media) for data storage when external hard drive is not available.
h.   Quart and gallon size ziplock bags to keep equipment dry.
i.   See through mesh cases to hold cords and misc.
j.   Roll of quarters for photocopying if needed.
k.   3X5 cards or flip pad for writing/notes in the field.
l.   Handy backpack or fanny pack with multiple pockets for storage to keep your hands free.

Downloading Images from Digital Camera

Each time you download pictures from your digital camera, store them in a unique subfolder of the current year. For example, if I've been taking pictures at a cemetery, I would create a temporary folder that includes my name, photo shoot, and date (day, month, year) such as "Barry Ewell_Beaver_Cemetery-120407." It makes it really easy to find photos when I am ready to sort, delete, name, and file.

Deleting Bad Images Is OK

As the years go by and your collection grows, it will be easier to retrieve photos if you've named and sorted them.

Simplify your photo-sorting process by eliminating pictures you don't need. As soon as you download images, delete the shots that are unusable—whether they're overexposed, underexposed, duplicates, or pictures where your thumb got in the way. But be sure to keep the ones that image-editing tools can improve.

There are pros and cons to various organizational methods. These guidelines will help get your files under control. You'll want to experiment to refine your own system.

Organizing Photos Using Windows XP

I try to organize my photos within a few days after downloading if not the same day. I use either the Windows XP Scanner/Camera Wizard or a program like iView Promedia 3 batch captioning software to sort and name.

To use the Scanner and Camera Wizard:
1. Connect your camera or memory card to your computer.

2. When prompted, click Copy pictures to a folder on my computer using Microsoft Scanner and Camera Wizard. Then, click OK.

3. On the Welcome to the Scanner and Camera Wizard page, click Next.

4. On the Choose Pictures to Copy page, click Next.

5. On the Picture Name and Destination page, type a name that describes all or most of the pictures you have recently taken. Then, click the Browse button to select a folder.

6. In the Browse For Folder dialog box, click the current year's folder within My Pictures. Then, click the Make New Folder button. Type a name for the new folder, and then press ENTER on your keyboard. Click OK.

7. When the Scanner and Camera Wizard appears, click Next.

8. On the Other Options page, you can choose to publish your pictures to a Web site or order prints. If you have finished working with your pictures, click Nothing, and then click Next.

9. On the final page of the wizard, click Finish.

The Scanner and Camera Wizard downloads your pictures to your new folder. Your pictures will have the name you typed at step 5 with a unique number, such as, "Beaver_Cemetery-001," "Beaver_Cemetery-002," and " Beaver_Cemetery-003."

A Few Words on Batch Naming
A key to organizing photos is to give batches of photos a similar name. "Batching" allows you to perform the same function (like naming) on multiple files at once. This saves time and ensures the changes you make to your files are consistent.

For example, give your Paris pictures a similar name at the beginning plus an additional descriptor to identify the specific photo, such as "Paris Eiffel Tower" and "Paris café night." Just open the folder, select all, and rename the photos so that all files for an event are grouped together. Once you've moved the files into the appropriate subfolders, you can rearrange them however you like.

Name Pictures Logically
One way to get organized quickly is by renaming your photos when you download them from a digital camera to computer. Digital cameras assign pictures alphanumeric names. But who remembers that JX1000054 was that wonderful sunset shot during your last vacation? Giving pictures descriptive names as soon as you download them will help you remember what they are.

What makes a good name? Think about how you might search for a picture later: Are you more likely to want to retrieve all of your sunset shots at once, or all your Virginia Library shots on the "Jones" line?

When you're naming your files, use an underscore (_) or dash (-) instead of a space between words to prevent problems later if you post your pictures online. The reason to underscore, or use dashes and no spaces in a file name is to keep the file name from becoming a security threat where viruses, etc. can attach themselves.

When it comes to photos with multiple persons, I will try to name all the persons. If I have more than five individuals as is the case in many family photos, I may title the photo "Ora Jones Family" and then in the catalog name all the persons.

Another key to organizing photos is to give batches of photos a similar name. "Batching" allows you to perform the same function (like naming) on multiple files at once. This saves time and ensures the changes you make to your files are consistent.

Tip: If you have a folder of pictures with the camera's default names, such as "DSCN3089," you can easily rename these photos all at once. Batch renaming of photos is a simple task that can be done quickly and will keep your pictures organized.

Searching for Pictures
Now that you have named your pictures to identify the people in each one, you can easily find pictures with a particular person in them. To search for a picture by file name:

1. Open your My Pictures folder.

2. Click the View menu, point to Explorer Bar, and then click Search.

3. In the All or part of the file name box, type the name of the person you're looking for, and then click the Search button. After a few moments, Windows XP displays pictures with that person's name in the file name.

Digital Photo-Organization Software
Photo-organizing software will automatically track information about each picture you add, including the date, file size, and image dimensions. That means you'll be able to search for photos taken at a particular time, or images taken at high resolution that you want to print.

Another great way to store and find your pictures is to use digital photo-organization software, such as Microsoft Digital Image Library (included with Microsoft Digital Image Suite). Digital Image Library has a batch rename tool that can automatically include the date and time the picture was taken in the file's name.

Creating a Photo Library
Digital Image Library or the software digital image software of your choosing makes it easier to find pictures you haven't named by showing thumbnails from all your folders simultaneously. For example, if you were to click on the "Barry_Ewell_Beaver_Cemetery-120407," the digital image software will show thumbnails of all the pictures you've added to any subfolder. It can show larger thumbnails than Windows Explorer, too, which makes them easier to see. You can also give star ratings to pictures to designate the best ones that you may want to share with someone at a later date.

Organizing and naming your pictures logically is a good practice that pays off later when you really need to find that special shot. Follow these best practices, and you'll have a computer full of easy-to-find pictures.

Using Voice Recognition to Digitize Your Family History

Recently when my father passed away, he left an extensive collection of hand written material in the form of a journal, letters, and thoughts.   While the material contains extensive history of our family, few others will have a desire to read the many hand written pages.   Voice recognition software has substantially simplified and reduced the time needed to manage the collection. My process is as follows:

1. Scan each page of the collection for digital preservation.
2. Using speech recognition software (Nuance Public Speaking 9), I am able to read the handwritten text directly into a Word document (with the aid of microphone connected into USB port) with all the correct punctuation and formatting.   The software recognizes over 98% of what I read. I am able to read at normal speeds exceeding 100 words a minute.
3. Once the text is captured, I make any editing changes and the text is now ready for further research. I can search the document with key words, cut & paste information, and so forth.

What is voice recognition? Voice or speech recognition is the ability of a machine or program to receive and interpret dictation, or to understand and carry out spoken commands.

For use with computers, analog audio must be converted into digital signals. This requires analog-to-digital conversion. For a computer to decipher the signal, it must have a digital database, or vocabulary, of words or syllables, and a speedy means of comparing this data with signals. The speech patterns are stored on the hard drive and loaded into memory when the program is run. A comparator checks these stored patterns against the output of the A/D converter.

In practice, the size of a voice-recognition program's effective vocabulary is directly related to the random access memory capacity of the computer in which it is installed. A voice-recognition program runs many times faster if the entire vocabulary can be loaded into RAM, as compared with searching the hard drive for some of the matches. Processing speed is critical as well, because it affects how fast the computer can search the RAM for matches.

All voice-recognition systems or programs make errors. Screaming children, barking dogs, and loud external conversations can produce false input. Much of this can be avoided only by using the system in a quiet room. There is also a problem with words that sound alike but are spelled differently and have different meanings -- for example, "hear" and "here."

Where is Voice Recognition Used?

1. **Dictation.** Dictation is the most common use. This includes medical transcriptions, legal and business dictation, as well as general word processing. In some cases special vocabularies are used to increase the accuracy of the system.

2. **Command and Control.** Voice recognition is designed to perform functions and actions on the system and are defined as Command and Control systems. Utterances like "Open Word" and "Start a new ___(command)__ will do just that.

3. **Telephony.** Some PBX/Voice Mail systems allow callers to speak commands instead of pressing buttons to send specific tones.

4. **Wearables.** Because inputs are limited for wearable devices, speaking is a natural possibility.

5. **Medical/Disabilities.** Many people have difficulty typing due to physical limitations such as repetitive strain injuries (RSI), muscular dystrophy, and many others. For example, people with difficulty hearing could use a system connected to their telephone to convert the caller's speech to text.

6. **Embedded Applications.** Some newer cellular phones and automobiles include voice recognition that allow utterances such as "Call Home."

Tips on Using Speech Recognition
The following tips are based on my experience with Nuances Dragon NaturallySpeaking 9.

1. Ensure that your computer meets the hardware specifications.
2. Use the latest version of the software Dragon NaturallySpeaking 9.
3. Install Dragon NaturallySpeaking after you have installed Microsoft Office.
4. Make sure that you have selected the U.S. vocabulary when you setup your user. Sometimes people mistakenly install the UK or Australian English model. This will cause many problems.
5. Ensure that you have selected the correct microphone type when setting up your user. If you are using a digital microphone then select it, if you're using a desktop array microphone then select it and so on.
6. When completing the initial training period, speak in a consistent and even tone of voice. Do not speak too softly or loudly and do not speak too fast or slow.
7. If the program is not responding well after you complete the first session of general training then do additional training. Ensure that your hardware is setup properly before you conduct the additional training.
8. Run the audio setup wizard once a week or when you find that the program is not responding well to your voice.
9. Ensure that the microphone is positioned consistently at the same distance from your mouth. The microphone should be positioned approximately 3 to 4 cm from your mouth and slightly below your bottom lip.
10. You must make corrections with Dragon every time it makes a mistake. If you do not make the proper corrections with Dragon Natural Speaking it will not improve. The ability for the program to become more accurate entirely depends upon you making the corrections.
11. In order to correct you must say either "correct that" or "correct the wrong words."
12. You are not making corrections if you select incorrect words with the mouse and then type over them. You are only making an edit. Dragon will never remember this is a correction and will never improve as a consequence.
13. Dragon is optimized for Microsoft Word and Microsoft Outlook. It will work in other applications with various degrees of success. It does not work well with Microsoft Excel.
14. The key to getting good accuracy from speech recognition is to think about a sentence before you say it, and then speak in phrases or sentences at a time. Do - not –speak- each-word. All language program words to be spoken as sentences not as individual words.
15. If you purchase a new microphone, especially if you are going from an analogue to a digital microphone it is best to complete a short general training session to begin a new user. This is because different microphones sound differently to the program.
16. Dragon NaturallySpeaking version 9 has some inbuilt tolerance for "UM" and "AH's" but it is not really capable of telling the difference between words and utterances. Again,

think of a sentence carefully before you pronounce it to the program. This will help enormously.
17. Back up your speech files to another medium like a CD-ROM every few months. With Dragon NaturallySpeaking this is called the USER file and is located in the Dragon NaturallySpeaking program directory. This will save you a lot of heartache if something goes wrong with your computer. Speech files can become corrupted quite easily.

Scanning Digital Images

As a genealogist, I have found the opportunity to digitally preserve 75% of the artifacts, documents and photos that represent my family's heritage using the flatbed scanner. Over 50% of the digital images I have come from other members of my family who have allowed me to scan what they have. In many instances I have gone to another person's home and set-up my scanner on a desk or kitchen table. I have scanned:

- **Photographs.** Scanning photographs for printing, for web pages, for Windows wallpaper, for emailing images to friends and relatives, images for newsletters or genealogical notebooks, and for PowerPoint slides shown at meetings and conferences. Since my photos are digitized I am now able to use editing software such as Adobe Elements and Photoshop to mend and enrich photos, combine images, create special effects, crop out unwanted images, and an endless number of options.

- **Copying documents.** I have scanned every conceivable type of document such as letters, post cards, journals, books, histories, children's art, and vital records. In conjunction with the scanned document, I have the OCR (Optical Character Recognition) software to convert the image back to editable text, suitable for loading into a word processor which has saved many hours in resources. More about OCR later.

- **Real artifacts.** Scanned artifacts of my ancestors that range from coins and handkerchiefs to keys and tools. I have found the scans to be rich with texture and color. Although I am not able to handle the item every day, the scan is the next best thing and I am able to share with other family members. Ideally, artifacts that are scanned should be flat in nature. I have tried scanning 3D items like dolls and have not had good results. Shiny metal objects have caused reflections. The key issues are lighting and depth where the camera offers much more control.

As I pursued digitizing my family heritage, I have become acutely aware of the need to understand the tools and their capabilities. When it comes to scanning, the process is relatively straight forward, however, there are some very important variables, such as the type of scanner to use, your scanning DPI, file format, editing software, and so forth that will make all the difference in the quality, and longevity of your work.

My first scanner was under a $100.00. While it performed the function of scanning correctly, I quickly became frustrated with the time it took to scan, sometimes several minutes. After some research, I spent $200 and was now able to scan in one-forth the time. When I stated scanning, I scanned everything as .jpg at 200 DPI. I was concerned about hard-drive space and time to scan. About 2 years into scanning, I began to see many of my .jpg files having pixel degradation; I was limited to the size and quality of my photos. As I searched out the problems, I was able to correct scanning mistakes and improved my use of the tool. I have since rescanned most of the items from the first few years. Before we get too far into the practicalities of using the scanner, I would like to develop a common understanding between us about the tool.

Flatbed Scanner. A flatbed scanner is usually composed of a glass pane (or platen), under which there is a bright light (often xenon or cold cathode fluorescent) which illuminates the pane, and a moving optical array, whether CCD or CIS. Color scanners typically contain three rows (arrays) of sensors with red, green, and blue filters. Images to be scanned are placed face down on the

glass and the sensor array and light source move across the pane reading the entire area. An image is therefore visible to the charge-coupled device only because of the light it reflects. Transparent images do not work in this way, and require special accessories that illuminate them from the upper side. A good flatbed scanner has an optical resolution of 1600–3200 ppi, high-end flatbed scanners can scan up to 5400 ppi, and a good drum scanner has an optical resolution of 8000–14,000 ppi.

Film Scanner. A film scanner is a device made for scanning photographic film directly into a computer without the use of any intermediate printmaking. They provide several benefits over using a flatbed scanner to scan in a print of any size — the photographer has direct control over cropping and aspect ratio from the original unmolested image on film, and many film scanners come with specialized software or hardware designed to remove scratches, film grain, and improve color reproduction from old negatives.

Film scanners can accept either strips of 35mm or 120 film, or individual slides. Low-end scanners typically only take 35mm film strips, while medium- and high-end film scanners often have interchangeable film loaders. This allows the one scanning platform to be used for different sizes and packaging. Film scanning usually have the choice of three resolutions: 2000, 3000, and 4000 DPI.

Scanner Quality. Scanners simply read color (typically read red-green-blue color (RGB) data from the array) information from a photograph or piece of film and record this information as a grid of pixels. This data is then processed with some proprietary algorithm to correct for different exposure conditions and sent to the computer, via the device's input/output interface (usually SCSI or USB, or LPT in machines pre-dating the USB standard).

The amount of detail captured with a scanner is determined by something called scanning resolution. Resolution is measured in samples per inch or SPI. Many times people refer to resolution with the term DPI, "dots per inch," or with PPI, "pixels per inch." SPI, DPI, and PPI all describe the same thing. DPI is the most commonly used term. DPI means that a scanner will capture so many dots or pixels for every inch of area scanned. For Example:
- If you were to scan a 5x7 photograph at 300 DPI you would end up with a digital image that is 1500 pixels wide and 2100 pixels in height. Some simple arithmetic was used to arrive with these numbers.
    - The photo being scanned was 5 inches wide and 7 inches tall.
    - The photo was scanned at 300 DPI "dots per inch." Simply multiply the resolution, 300 in this case, by the dimensions of the photo being scanned, 5 x 300 = 1500 and 7 x 300 = 2100.
    - Resolution determines how much information a scanner captures from the photograph of film being scanned. The higher the resolution, the more pixels the resulting digital image will contain. The more pixels an image contains, the more detailed the digital image is.

Types of Scanning Modes. When you are ready to start scanning you will notice you have several choices. They are as follows:

- **Color Mode.** (Millions of Colors). Use this mode to scan documents, and photos in the original color. The scanner scans three color samples per pixel, one each for Red, Green,

Blue (RGB), the combination of which is the one resulting color from the 16.7 million color choices possible with 24 bit color.

- **Grayscale Mode.** (256 shades of Gray and looks like a black & white photo). Use this mode to scan a photos, pencil drawings, and etc.

- **Line art Mode.** (2 colors, either White or Black). This looks very much like a fax or clipart with no variations of gray. The name comes from ink drawings. It is a very poor choice for photographs and documents used for family history digitizing and archiving program. It provides too much contrast.

- **Halftones Mode.** This scanner mode is for images to appear in magazines and newspages. It is a very poor choice for photographs and documents used for family history digitizing and archiving program. It provides too much contrast.

Print Scans vs. Film Scans
You're probably wondering if it's better to digitize your prints or your slides and negatives. Scanning film, slides or negatives will most always produce better digital images than scanning prints. Slides & negatives are the original. Prints are second generation copies of the original film and do not contain as much information or detail as the negative they were made from.

If you have the option of scanning a negative instead of scanning a print made from the negative, scan the negative. However, if this is not the case scanning your prints is a great alternative.

There are some limits to print scanning that you should be aware of. Most color prints from your regular photo finisher contain around 300 DPI of detail. There are exceptions to this 300 DPI rule. Depending on the quality of the print being scanned and how crisp the image is, scanning at 600 DPI may sometimes produce better results. It's normally difficult to see much difference when comparing a 300 DPI print scan and a 600 DPI print scan. 600 DPI scans produce much larger files that are more cumbersome to work with but ensure every detail in your print is recorded in digital form. If you want to be sure as much detail as possible is captured during scanning, go with 600 DPI print scans. If you want files that are easier to work with, 300 DPI scans would be a better choice for you.

One of the benefits of digitizing your photo collection is that you have the ability to create new prints or enlargements from your new digital images.

The quality and size of the prints you'll be able to make from your scanned images depends on the quality of the original film or print that was scanned. The charts below represent the quality of prints made from your scanned images. The sizes displayed horizontally represent the size of the print being made from your scanned image. On the left side of each chart is the resolution of the film being scanned or the size of the print that was scanned. Film scans are the best way to create large prints from digital files.

Printing Size & Quality Recommendations from Standard 35 MM Film Scans.							
Scan Resolution	3 x 5	4 x 6	5 x 7	8 x 10	11 x 14	16 x 20	20 x 30
2000 DPI	Great	Great	Great	Good	Fair	X	X
3000 DPI	Great	Great	Great	Great	Good	Fair	X
4000 DPI	Great	Great	Great	Great	Great	Good	Fair

Printing Size & Quality Recommendations from 300 DPI Print Scans.							
Size of Print Scanned @ 300DPI: Below	3 x 5	4 x 6	5 x 7	8 x 10	11 x 14	16 x 20	20 x 30
Wallet Scan	Fair	X	X	X	X	X	X
3 x 5 Scan	Great	Great	Fair		X	X	X
4 x 6 Scan	Great	Great	Good	Fair	X	X	X
5 x 7 Scan	Great	Great	Great	Fair	X	X	X
8 x 10 Scan	Great	Great	Great	Great	Fair	X	X

Printing Size & Quality Recommendations from 600 DPI Print Scans.							
Size of Print Scanned @ 600DPI: Below	3 x 5	4 x 6	5 x 7	8 x 10	11 x 14	16 x 20	20 x 30
Wallet Scan	Good	Fair	X	X	X	X	X
3 x 5 Scan	Great	Good	Good	Fair	X	X	X
4 x 6 Scan	Great	Great	Good	Good	X	X	X
5 x 7 Scan	Great	Great	Great	Good	Fair	X	X
8 x 10 Scan	Great	Great	Great	Great	Good	Fair	X

What Is the Right Scanning Resolution?

The answer will vary depending upon what your needs are. I have spoken with many professional archivists who are scanning rare documents. Almost universally, the answer I have received is they scan documents in color at 400 dpi and save the images as .tiff. Based on their response, I have scanned about 90% of my images at 400 dpi and save as .tiff. The images are large (many exceeding 10 megabytes) and that's ok. This is my family history, I am scanning not only for my personal interests but for the generations that will follow. Now when I share the images, I may save them as .jpg images usually less that 1 meg in size, but the original is in tact providing the key source of information.

Ok that's what I do. The following is a discussion about scanning resolution and will give some more insight and help to better understand the concept of resolution. The best resolution to scan your images at depends on how it will be used - on screen or in print. For most users, it is rare that you will need thousands or even more than 200-400 dpi pixels of resolution. (dpi means pixels per inch, which means that if we scan 6x4 inches at 150 dpi, then we create (6 inches x 150 dpi) x (4 inches x 150 dpi) = 900 x 600 pixels. But if we are scanning 3x2 inches, then 300 dpi creates the same 900 x 600 pixels of resolution.

There are essentially 5 questions to take into account with scanning:

- **Size of the original image?** Are you scanning a 3X5 photo?

- **Size of the printed image?** Will the image you are scanning be reduced or enlarged?

- **LPI at which your image will be printed?** This question depends upon the printer and paper you are using. LPI depends on the printer you are using. The type of paper, also affects LPI (lines per inch).

-
- Your final image resolution is usually about double the LPI at which the image will be printed.

- **Resolution Multiplier?** This number is usually 2.

- **Editing of the scanned image?** It is usually better to scan at a higher resolution than you will be using. When you edit photos, there is a loss of pixels. Scanning at the higher resolution helps to compensate for what is lost during editing.   Remember the larger the resolution, the larger the file size.

The following are examples of how to calculate your final image resolution:
- If the size of your image will not change, multiply LPI by your resolution multiplier. LPI x 2.
  For example, an image destined for a brochure on uncoated paper using offset printing needs a final resolution of approximately 133 x 2 or 266.
- If the size of your image will change, multiply LPI by your resolution multiplier and then by the size of your final image as a percentage of the original. LPI x 2 x %.
- For example, if our image for the brochure, above, is to be enlarged by 25%, then it needs a final resolution of 133 x 2 x 125% or 333. If it is to be reduced by 25%, then it needs a final resolution of 133 x 2 x 75% or 200. (I've rounded up in each case.) You don't know the percentages?
- You may be fine scanning at the final resolution arrived at by one of the formulas, above. However, since most scanned images need some type of image editing, scanning at a slightly higher resolution is often advantageous. It is easier to "throw out" unneeded resolution after scanning than it is to restore lost resolution after the fact. Just remember to reduce your image to the final resolution before placing it in your document for printing.

Typical LPI Guidelines

The following are a few guidelines based on common uses for which you may have need for your digital images.

Output/paper	Typical LPI
Screen printing	35-65
Laser Printer/photocopier (copier or matte laser paper)	50-90
Laser Printer/photocopier (coated paper)	75-110
Quick printer (uncoated or matte bond paper)	75-110
Offset printing (uncoated paper)	85-113
Offset printing (coated paper)	120-150+
High quality offset or gravure (such as glossy magazines)	150-300+

Scanning with Archiving As Your Priority

Archiving includes capturing all the detail contained in your film or prints. If you're unsure about your future needs or simply want to preserve as much detail as possible with your scans then archiving would be the choice for you. Modern scanning equipment can sometimes capture more detail than a piece of film or print contains so the highest resolution possible is not always the best choice. Scanning beyond the detail contained in a given image only adds more data without any extra detail. Prints typically contain no more than 600 DPI worth of detail so scanning at higher resolutions is not necessary. However slides and negatives contain much more detail per square inch and thus need to be scanned at much higher resolution than prints. The amount of detail a slide or negative contains varies with film type and film speed.

Archiving Resolutions for Film Scans
The best resolution for archiving depends on the type and speed of the film being scanned. Faster films contain less detail than slower films and can be scanned at lower resolution. The chart below makes some recommendations based on film type and speed.

Scan resolution needed to capture all usable detail organized by film type:	
Scan Resolution	Film Type
2000 DPI	Most All Films
3000 DPI	Most Print Films and Slide Films 200 ISO or faster
4000 DPI	Films of 800 ISO or faster

Archiving Resolutions for Print Scans
There are some limits to print scanning that you should be aware of. If you wish to archive your photos, film scans are the way to go. If you have a choice of scanning a print or the negative the print was made from, we recommend scanning the negative. Most color prints from your regular photo finisher contain around 300 DPI of detail. There are exceptions to this 300 DPI rule. Depending on the quality of the print being scanned and how crisp the image is, scanning at 600 DPI may sometimes produce better results. However, it's normally difficult to see much difference when comparing a 300 DPI print scan and a 600 DPI print scan. 600 DPI scans produce much larger files that are more cumbersome to work with but ensure every detail in your print is recorded in digital form. We don't charge more to scan your prints at 600 DPI. If you want to be sure as much detail as possible is captured during scanning, go with 600 DPI print scans. If you want files that are easier to work with, 300 DPI scans would be a better choice for you.

Scanning Recommendations by Image Type
As you preserve your family history, you come across a variety of image types (e.g., documents, maps, and photographs) each requiring thought and consideration about its preservation and digitization. Each image will have multiple uses and needs to be planned for:

- **Master** files (sometimes called archival files) are the source files for all other digital files and ensure the long-term usability of the digital information. Master files should be saved in TIFF file format, and should not be compressed, altered or resized. Master files should be stored on a stable medium and should remain in a controlled environment.

- **Sharing/Access** files are for day-to-day use. They may be placed on web pages or used for printing. Access files are expected to be of good quality, but they may be modified to meet the needs at hand.

- **Thumbnail** files are very small files for use in databases or web pages.

The following are recommendations for preparing the digital image for preservation and use:

Image Type	Printed Text	Damaged Printed Text	Handwritten Manuscripts	Maps, Drawings
Master	Scan Type: Bitonal Resolution: 400-600 DPI Format: Uncompressed TIFF	Scan Type: 8-bit grayscale or 24-bit color Resolution: 400 DPI Format: Uncompressed TIFF	Scan Type: 8-bit grayscale or 24-bit color Resolution: 400-600 DPI Format: Uncompressed TIFF	Scan Type: 8 bit grayscale or 24-bit color Resolution: 200-400 DPI Format: Uncompressed TIFF
Access	Type: 8-bit grayscale/24-bit color Format: JPEG Compression: Medium Spatial Resolution: Resize to 1024 x 768 pixels	Type: 8-bit grayscale/24-bit color Format: JPEG Compression: Medium Spatial Resolution: Resize to 1024 x 768 pixels	Type: 8-bit grayscale/24-bit color Format: JPEG Compression: Medium Spatial Resolution: Resize to 1024 x 768 pixels	Type: 8-bit grayscale/24-bit color Format: JPEG Compression: Medium Spatial Resolution: Resize to 1200 pixels across the long dimension (large maps) size to 640 x 480 pixels (small maps)
Thumbnail	4-bit grayscale/8-bit color Format: GIF Spatial Resolution: Resize to 150-200 pixels across the long dimension 72 DPI	4-bit grayscale/8-bit color Format: GIF Spatial Resolution: Resize to 150-200 pixels across the long dimension 72 DPI	4-bit grayscale/8-bit color Format: GIF (or JPEG) Spatial Resolution: Resize to 150-200 pixels across the long dimension 72 DPI	4-bit grayscale/8-bit color Format: GIF (or JPEG) Spatial Resolution: Resize to 150-200 pixels across the long dimension 72 DPI

Image Type	Black and White Photographs	Color Photographs	Works of Art on Paper	Microfilm
Master	Scan Type: 8-bit grayscale Resolution: 400-600 DPI Format: Uncompressed TIFF	Scan Type: 24 bit color Resolution: 400-600 DPI Format: Uncompressed TIFF	Scan Type: 8-bit Grayscale/ 24-bit color Resolution: 400 DPI Format: Uncompressed TIFF	Scan Type: Bitonal Resolution: 400-600 DPI (blown back to original size) Format: Uncompressed TIFF
Access	Type: 8-bit grayscale Format: JPEG Compression: Medium Spatial Resolution: Resize to 1024 x 768 Pixels	Type: 24-bit color Format: JPEG Compression: Medium Spatial Resolution: Resize to 1024 x 768 Pixels	Type: 8-bit grayscale/24-bit color Format: JPEG Compression: Medium Spatial Resolution: Resize to 1024 x 768 Pixels	Type: 8-bit grayscale/24-bit color Format: JPEG Compression: Medium Spatial Resolution: Resize to 1024 x 768 pixels
Thumbnail	4-bit grayscale Format: GIF (or JPEG) Spatial Resolution: Resize to 150 - 200 pixels across the long dimension 72 DPI	8-bit color Format: GIF (or JPEG) Spatial Resolution: Resize to 150 - 200 pixels across the long dimension 72 DPI	4-bit grayscale/8-bit color Format: GIF (or JPEG) Spatial Resolution: Resize to 150 - 200 pixels across the long dimension 72 DPI	4-bit grayscale/8-bit color Format: GIF Spatial Resolution: Resize to 150-200 pixels across the long dimension 72 DPI

Being Organized for a Large Volume of Scans
Here are a few tips for organizing, scanning and archiving your photos and slides:

1. The first and most important step in scanning a collection of photos or slides is to make the hard decisions about what you want to scan. A good rule of thumb is that you should only scan one out of five pictures from a roll of film. Most people can go through a set of 36 photos or slides and quickly see the 7 or 8 they would like to scan.

2. Of course, if these are the only existing photos of your parent's wedding, then you probably want to scan them all. Otherwise, be discriminating - nobody needs to scan out of focus pictures of a cousin's friend's birthday party ten years ago.

3. The other important decision that affects how long a scanning job will take is the resolution that you use for scanning. Scan your photos between 200 and 400 dpi (dots per inch) resolution and most slides don't need more than 2000 dpi. For instance, scanning photos at 300 dpi will take twice as long and use twice as much disk space as 200 dpi, but few people will see much difference visually.

4. Scan all photos and slides to TIFF or JPEG files, using your scanner software's default settings. If disk space is an issue, JPEG files will take up only 10% of the disk space of TIFF format.

5. Use the automatic file naming capability of the scanner software. For instance, most scanner programs will let you scan images one after another and write them to files with a fixed name but in increasing numerical order (i.e., John Jones Funeral 1987-001.jpg, John Jones Funeral 1987-002, etc.). This can save a lot of time agonizing over what to name each scan at the time you are scanning. Try to put the year into the file name - and maybe the place or event.

6. Scan images in batches, usually from one stack of prints or a box of slides. Use a common file name pattern for each batch (like Summer Vacation 1994-nnnn.jpg). After each batch, use an image viewer to make sure the images look good, then move the images to a different folder on your hard drive.

7. Be very, very careful not to waste hours making scans, and then finding out at the end that something was wrong and you need to re-do all that work. You'd be surprised how often this happens, so be careful!

8. When you are done scanning for the day,
   - If you have time rename the files you scanned or schedule a time. Make sure you backup the files you just scanned to a hard drive or CD/DVD. If you are using CD/DVD, burn every image you've scanned, label the CD/DVD, and then make sure you can read the images from the CD/DVD. Burn two sets of CD's, keep one set for yourself, and store a master copy separately. Only use the master copy if your main copy has problems, otherwise don't touch it again. If friends or relatives want a copy, make them a copy from your main copy. CD's/DVD can fail, wear out, get scratched, get lost- keep two copies!

- Print out small thumbnail images for each CD/DVD and store it with each CD so you can find an image later. It easy to find images in a normal photo archive, but a stack of silver CD's/DVD's isn't especially useful when you look for something later. There are lots of programs for making thumbnail image prints from a collection of files.

The key to successfully scanning photos and film/slide is to do a bit of planning and organizing before you start. If you do this, and if you don't scan every photo and slide, it'll be far less difficult than you think. After all, how many out-of-focus images of your friends do you need?

How to Get Better Scans and Images Using the Histogram
The simplest way to obtain better scans is to correct and improve the contrast of the image which also improves colors using the histogram tool in your scanner or photo editing program.   This concept can really be used for any image be it a digital image from a digital camera, scanner, or other source.

Using the histogram is much simpler than it sounds, but it will make all the difference in your final image. First lets define the "histogram:"
Definition: A histogram is a graph that depicts the tonal range of an image. The far left column represents 100% black pixels and the far right represents 100% white pixels, with all other tones spread in between. Most scanning software, photo editing software, and some digital cameras allow you to view an image's histogram.

The Histogram is a chart of the reflected light values that make up a photo. It's based on a scale of 0 to 255. 0 reflection is black. 255 reflection is white. The Histogram is not a chart of the colors in the photo. It is a chart of the intensity of the reflected light. Bright blue might have a reflected value of 210. But then, so might bright red or light gray.

Ideally, the colors in a photo would always reflect the right amount of light. But far too often, they don't. Sometimes they reflect too much light. Other times not enough. That's where the Histogram comes in. By adjusting the high and low points of the Histogram, you can adjust the amount of light that the colors in the image reflect.

Can the Histogram correct every image? Almost. You can only do the best with the image you have. Sometimes there are no blacks or whites in the photo. You simply take an educated guess and see what works best for your.
Histogram adjusted as if there was white in photo.

Using the histogram I have been able to see some amazing results. I was able to take
- Polaroid photos (refers to a brand name of a camera that printed out the photo immediately after it was taken) that were taken in the 80's and badly faded were almost returned to the original color.
- One of a kind photos that were very dark and brighted them up to see faces.
- Poor document images that had gone through many generations of photo copying and darken the image enough to allow for the OCR scanner to recognize the characters.

The histogram is a tool I use on most of the images I scan or edit in the photo editing software simply to see if I can improve the image.

Digitizing Text with Your Scanner and OCR

As a genealogist, I have my fair share of copied and printed material that range from family history books and stories to documentation. I am fine with most of the material simply being stored as digital images of the work. There are situations where I prefer to take the document and turn it into a Word (.doc) document for easy distribution and sharing. In this case I use Optical Character Recognition (OCR).

Recently I scanned a journal that included photos, histories and related material for a life of several generations. Much of the text was type written. After I scanned each page, I
- Used my image editing software to separate the photos and save them as separate files.
- Imported the images into the OCR software from which I was able create a word document.

The OCR function software recognized 98% of the text. The time I would of spent transcribing was cut by 95%.

In another Situation, I had 30 2-3 page family histories that I had in my files that were copies of copies from the 1960's.   After I scanned the histories, I imported them into OCR software which recognized over 95% of the characters, even though they were faded. I was able to correct the text and use spell checker right inside of the OCR software.

The most common OCR programs are Omnipage and Textbridge and when used in automatic mode both are pretty foolproof - but not infallible. Accuracy will depend upon the quality of the original, they will try to match the font and layout but probably won't… and you will need to check the spelling after you have saved the scanned text as a Word (or equivalent) document. They may also add unnecessary tabs that you will need to remove. Just remember this is better than typing it again from scratch.

Most scanners come with some level of OCR software. A basic OCR package will usually block out text on a page (to distinguish it from any photos or other non-text elements) and then automatically translate it. It should be able to reasonably imitate the typefaces used on the page (so that headlines are larger, for example), and separate paragraphs, outlines, etc.

More complex OCR software will allow users to specify exactly what areas of a scanned document should be converted into text, or will be able to convert other languages in other alphabets, such as Russian, Hebrew, or Arabic.

A few tips for OCR
When you use OCR you can scan and save documents and then import them directly into the software or you can scan the document directly into the OCR software.

For example: Having opened the OCR program, put the first page in the scanner and click on the "Auto" button. The program will first scan the page as an image - then the OCR magic begins. When all the text from the first page has appeared (mistakes and all) put the second page in the scanner and press Auto again… and so on until you have finished scanning the entire original. Note that there is usually a limit to the number of pages you can hold in memory but you do not want separate documents for each page.

Now you must go to the "File" menu and select "Save As". Choose Word or equivalent. Now you can now use Word to open the new document and start cleaning it up.

The following are a few tips for how to more effectively use the OCR.

1. **Align the text to be scanned squarely on the scanner.** Lines of text that run uphill or downhill have higher error rates.

2. **Start with a good original.** Is the paper wrinkled? Try ironing it (warm, not hot iron) or pressing between heavy books. Erase smudges.

3. **Photocopy text that curves into the binding of a book.** Text that curves into the binding of a book has higher error rates. You can improve this in some cases by photocopying the page and then scanning the photocopy.

4. **Photocopying may help originals that are on thin paper.** Photocopying may also help originals that are on thin paper when there is printing on the reverse side. Sometimes the ink on the reverse side is read by the scanner, and confuses the OCR process.

5. **Make the scan the best you can**. Make sure the scanner bed/glass is clean, smudge-free. Keep the document straight and even so you don't end up with a "skewed" image. Adjust the color/contrast/brightness so the background is light/white and free of "artifacts" (such as a pattern in the paper) and the text is dark. Scan at 300dpi or better.

6. **Error rates will rise with some letter forms.** Error rates are higher when letterforms degrade (as with poor photocopies), or when the original is of poor quality (like copy produced on onion skin with a typewriter with clogged "e"s).

7. **Turn one document into many.** Try breaking the scanned original down into smaller chunks (crop out non-text elements or save columns of text as individual images) and run your OCR software on each part separately. You'll lose formatting but gain a more accurate text document. However, newer OCR software is getting better and better at retaining formatting of forms and tables so you may want to trade in your old OCR software for some newer OCR software solutions.

8. **Proofread.** No matter how accurate the program, all are fallible. Proofread, proofread, and proofread the finished document.

Inkjet vs. Photo Labs for Printing Your Digital Images

As I digitize key family heirlooms, documents, photos, and etc, I desire to take some of the images and print them as a form of physical backup and general use. I have debated for years whether to have them printed out by my local photo merchant or trust in my inkjet printer, which by the way, does a very nice job. I recently did extensive research into the matter and came up with the following conclusion:

I will have my important digital images printed at trusted photo labs.

Rationale:

Key site: Wilhelm Image Research
                 http://www.wilhelm-research.com/

                  Wilhelm Imaging Research performs extensive research on the stability and
                 preservation of traditional and digital color photographs and motion pictures.

The following are some of the key notes of my research:

Paper and Ink matter. When you read claims by the manufacture to use X paper, Y Ink, with their printer for best results, believe it. When it comes to printing images for preservation, I think twice now when I see a sale for cheap ink and paper. If it's not the brand I am looking for then I don't buy it. "Cheap" off-brand ink fades more rapidly.

What about using off brand ink and paper for other projects? Sure. I still use the "cheap" supplies, but at least I know what to expect.

"When properly stored, dyebased inkjet and dye diffusion thermal transfer prints have stability comparable to that of traditional photographic prints."
But ink jet prints are more vulnerable to certain kinds of damage:
Water damage
- Traditional photographic prints are fairly stable in water.
- Inkjet prints are completely destroyed when they become wet, while some are more water-resistant.
Pollution
Air pollution and related airborne elements are cause for some colors to fade very rapidly. Ink jet prints had this color shift problem less than a month after printing.
Photos in frames behind glass help to block UV rays and are less susceptible to damage from pollution.

So You Want to Use Ink Jet for Your Archival Images?
If you are going to use Inkjet, make sure
1. Dyes can interact chemically with coatings on papers—you should always make sure a paper is compatible with your inks.
   - Many dye-based inkjet prints are susceptible to rapid, unpredictable chemical fading caused by oxidation from air pollution, especially in standard glossy or semigloss papers.

- Dye-based inks are less expensive than pigment inks and tend to have larger color gamuts, but they are less lightfast and chemically stable. Early dye-based inkjet prints faded very rapidly—in months, but newer dye-based inks have much greater fade resistance—25 years or more when displayed under glass.

2. Search for "Archival" dye inks which are stronger than ordinary dye inks, except when used on coated papers.
   - Pigments are tiny particles that come suspended in the solvent—that aren't dissolved.
   - Pigment inks tend to be more expensive than dye inks, but they are much more lightfast and chemically stable. Lifetimes are estimated at 80 to 200 or more years.
   - Epson is currently the only supplier of pigment based inkjet printers, but several independent ink manufacturers supply pigment inks (Luminous, Lyson, Media Street and MIS).
   - Because pure pigment inks have a difficult time achieving high Dmax (deep black), dyes are often added to pigmented inksets. Fortunately, black dyes tend to be more stable than colored dyes.
   - Pigment inks which have zero dye components offer the most stability.
3. Cheap third party inks should be avoided, period.
4. Some clog print heads.
5. Not all third party inks fall into the "cheap" class. Several have been formulated for high quality, longevity, and/ or excellent B&W performance.

6. Media
   - No longer can we think in terms of ink alone. The media upon which the inks are printed, has an extraordinary effect on the longevity of inks.
   - Any paper carrying the WIR Seal has been tested to have a display life of 25 years or more.
   - The best papers for archival longevity are 100% rag or cotton-based and acid-free, though some non-cotton papers are quite long-lived.

7. Environmental factors
   - Using PremierArt™ Print Shield, a lacquer based spray for all ink jet prints offers protection from light, water, moisture, airborne contaminants and even fingerprints that attained significant increases in print permanence ratings.
   - Other manufacturers may promote a single ink and media combination that achieves a high lightfastness rating; but this high rating is often achieved with only one or two specific papers, and the prints, especially those made with a swellable paper, may be susceptible to damage with normal handling.
   - Other protective measures include covering the print with UV filtered plexiglass. As with any artwork, it is important to include a mat around the print to maintain a protective air space between the glazing and the artwork—preventing moisture condensation on the print.

Best Results When Using Photo Printers
The following are some photo printing tips and tactics for getting the best results out of your photo printer.

1. **High Resolution.** Resolution determines the quality of the printed text and images. It's measured in dpi (dots per inch), the maximum number of dots the printer can print in a square inch. Higher dpi means higher resolution. The higher the resolution, the sharper the photos

will be. Get a printer with a minimum of 1200 x 1200 dpi for good quality. For example HP Photosmart 8450 Photo Printer offers Up to 4800 x 1200 optimized dpi (Photo Paper, 1200 x 1200 dpi input).

2. **Right Format.** Save your photo in the correct format. For emailing, you can use the JPEG format but for printing save your pictures in the TIFF format. TIFF format results in a rather larger file size, but it produces the best results. The JPEG format is more suitable for e-mailing as it results in smaller, compressed files which are ideal for sending by e-mail.

3. **Printer Settings.** Set your photo printer settings to "highest" print quality when printing photos. But for small prints such as (3X5), normal resolution may be sufficient. Refer to your photo printer users guide to find out how to change quality settings.

4. **Photo Editing Software.** Use a good quality photo editing software to alter your digital photographs, to remove dust marks and specks. The printer will pick up all the flaws even if they're small.

5. **Type of Photo Paper.** Using photo papers will give you the best results as they are especially designed for this purpose. Letting your photo printer know what type of paper you are using can have a remarkable effect on the completed print. The plain paper setting uses the most ink, whereas glossy film and photo paper settings use the least. The main differences in all photo papers are; opacity, brightness, weight, caliper (thickness) and finish.

6. **Paper Settings.** Paper settings control the amount of printer ink that's put down on paper, so using the paper setting that matches your photo paper is crucial for generating good prints. Different paper types need different settings. For instance plain paper setting uses more ink compared to glossy or photo paper setting. Find the accurate setting for your paper by trying different settings.

7. **Photo Paper Drying Time.** After printing give your photo paper sufficient time to dry before you frame it. Drying time may vary according to temperature, light and humidity. In general it is recommended to let the digital photograph print dry for roughly 24 hours.

Choosing the Photo Lab to Print Your Digital Photos
So you have decided to take your photos to a photo lab? It's not hard to find one or is it?
A lot of people I talk to don't believe there is any difference between labs. But over the years I've learned the differences can be dramatic. Before you commit to have a photo lab handle and print your important family images ask questions like

- What services do you offer?
- What if I don't like the way my photographs are printed?
- How long does it take?
- How long have you been doing this?
- Can I see some sample work?
- How often do you monitor the quality of the chemicals?
- How often do you do maintenance on the machines?
- Do you manually correct for negatives that are under or overexposed?
- Do you check the print quality and redo problem prints before packaging orders?
- How many different printers work in the lab?

- Can I request a specific lab tech if I like their work?

Your needs might not be as varied as mine but you should still be concerned with quality. I feel one of the most important things to consider before taking your images somewhere is to ask what business they're in? If I'm going to take the time to create a series of photographs, do I want to trust them with a lab whose main business is not photography?

Many of these labs are installing state-of-the-art printing equipment, but the machines are only as good as the people running them.

If you're considering a one-hour lab for convenience, talk to their lab people. Ask them what services they offer and how long they take. Pretty early in the conversation you'll usually get a feel of how well they know their job and equipment. If they seem confident about what they are doing, ask them how long they have been printing and also if they shoot. Ask why some pictures come out too light and why some come out too dark. If they can comfortably explain this to you, ask if they "fix" prints like these while printing or if the machine does it for them. If they try to convince you that the machine will automatically correct the print while the roll is being printed, move on to another lab. As good as machines are getting, they cannot correct a negative nearly as accurately as a skilled person adjusting the machine manually can.

If the lab has a counter person, ask if you can talk to one of lab techs. If they have to get from behind the deli counter, move on to another lab. Don't be afraid to ask the same kinds of questions in camera shops and even pro shops.

After you find a lab that seems to fit your criteria and you are comfortable that they know what they are doing, order a reprint of a negative that you know is good. Take that print and compare it to your original print. Better yet, have the same negative printed at a couple of other places and lay them all out next to each other (print the name of the lab on the back of each print so you will know whose is whose). What you may see is that the prints that you thought were great now look bad, or vice versa.

Converting Videotapes to DVD

Most of us have old VHS home videos that have been collecting dust in the back of the closet for years. These memories include:

- Your wedding video.
- Your children growing up.
- Family vacation footage.
- Special events. Graduations, baptisms, sporting Events, holidays, even the birth of your child.
- Family Stories. Grandpa telling his story on tape.

If you have plans of keeping the memories, it is important that you convert the VHS tapes to digital. VHS wears down with each playing in addition to the deterioration that is taking place due to heat, humidity and improper storage which causes the magnetic particles to decay the that represent your family memories. By converting the VHS tapes you will literally stop the deterioration. In addition, you will be able use your computer to edit the footage (e.g., cut out boring and blooper moments, add music or narration, and make extra copies for your family and friends).

How does it work? To transfer a home VHS movie to a DVD, the movie must be transferred from the VHS analog tape to the computer, where it can be edited and enhanced. Three are three items that are needed to get started:

1. A computer with (internal or external)
   - DVD-burner to transfer digital files to DVD.
   - Video capture device to get the video in and out of your computer
2. A camcorder or VCR which can play your old videotapes.
3. Editing software

Video Capture Options

Transferring videotape footage to DVD is a straightforward process. First let's make sure you have the right hardware. There are three standard options that most individuals use:

1. **A Video Capture Card.** Records (captures) and converts (digitizes) the video. These cards are the best choice for high-end video editing. A quality capture card gives you customizability and top quality results. If you are not comfortable opening your computer to install a video capture card, though, consider a simpler method. Capture cards cost from $100 to $10,000.

2. **An External Capture Device.** This is a small box that sits between your VHS tape player and your computer. This is the best choice for a computer beginner. Connecting data cords run to your VHS tape player, through this box, then to a USB port or FireWire port on your computer. This box allows you to capture VHS video without adding a video capture card inside your computer. These devices are easy to use and affordable-from $50 to $150-but don't give you as much editing freedom or power as video capture cards offer.

3. **Graphics Cards with Video Capturing Capabilities.** These cards are a new commodity being produced by graphic card manufacturers. These cards incorporate video capturing capabilities so you don't need an additional video card. This is the perfect choice for

those purchasing a new computer, because it's less expensive than buying a video card and a separate capture card. A single card also puts less strain on your computer.

Digital Video Software

Once you have all your tools in place and learn to use them, you can archive your old videos quickly onto quality DVDs. In addition to the hardware, you will need video editing software that will assist with capture, compression and editing (e.g., narration, transitions, menus, background music). In some cases the software will come with a video capture card or device. Some of the software to consider would include:

- Adobe Premiere elements
- Ulead Video Studio
- ShowBiz DVD
- Win DVD Creator
- Nero Ultra Edition
- Easy Media Creator
- Sony Vegas Movie Factory
- Pinnacle Studio Plus
- Apple's Final Cut
- DVD Movie Factory
- Windows Movie Maker (Free) that can perform some of the above functions.

Computer Memory, Speed, and Disc Space

Video editing is a power-hungry task. The more memory your computer has and the faster your CPU is, the quicker and easier the job will be. At minimum you will need:

- 2.8 GHZ CPU
- 512 MB of RAM
- 40-120 GB of storage. Movies captured from VHS take up 12-14 (GB) for every hour of footage. If you don't have that large of space on your computer, consider adding an extra internal/external harddrive. You can purchase 250 GB and larger for $100-plus.

Transfer & Edit Your Video

Whichever video capture option you choose, the steps for capturing and editing the video from your camcorder or VCR are basically the same:

1. **Connect your VCR/Camcorder to input jacks on the video card or external device.**
2. **Open the editing software to capture the video.** Open your video software and select the "import" or "capture" option. The software should then walk you through the steps necessary for recording the video to your computer.
3. **Save the video at the highest quality possible.** Old videotapes are already of poor enough quality. This will help keep the footage from losing any more quality during the compression process. You don't have enough space on your hard drive? Consider capturing, editing and burning small sections of video at a time. Once you have transferred the film to DVD, delete it from your hard drive to free up precious space. Now you are ready to the next section of footage freeing up space for more video transfer.
4. **Edit out unwanted footage.** Unlike VHS tapes, once you have transferred the footage to your computer, you are now able to create a "clean" finished product with your digital video editing software by
   - Editing and rearranging the scenes as you want them to appear.

- Adding special features such as titles, photos, narration, menus and background music.

For more information consider:

- Making Movies: From VHS to DVD
  http://www.pcworld.com/article/id,125517-page,1/article.html

Create Your DVD
Once your film is "clean," the file gets compressed into MPEG-2 format before being burned onto a DVD. Your video editing software will be able to walk you through the process.. A couple of recommendations:
- Limit your video transfer to DVD to 1 hour or less for best quality.
- Purchase high quality write once DVD-R or DVD+R disks (Not rewritable).
- Burn several versions of the video to DVD (especially if you are going to delete the images off your hard drive) using at least 2 as backup copies. DVD-R, which is most compatible with most DVD players.
- Test your DVD recordings on several DVD players (yours and other family members) to make sure they play. If not, you will be able to trouble shoot what the issues are and correct accordingly.

Other Options for Transferring Video to DVD
1. **Professional Service.** Pay a professional to convert your VHS tapes to DVD, although this service is expensive.

2. **Use a DVD Recorder.** If you don't have a PC, you can use a DVD recorder. The basic method for transferring video from VHS to DVD using standard equipment isn't complicated. You connect an RCA cable from the VCR's video and audio outputs to the DVD recorder's inputs, press Play on the VCR, and press Record on the DVD recorder. You don't need any additional gear such as a PC video capture card, because the DVD recorder has all the necessary capture and conversion features. Unfortunately there's no way to speed up this process: Every minute of tape takes a minute to record.   For more information consult:

   Answers To Basic Questions About DVD Recorders - Introduction and Index
   http://hometheater.about.com/od/dvdrecorderfaqs/a/dvdrecfaqintro.htm

   How to Convert VHS to DVD with a DVD Recorder
   http://www.diskfaktory.com/tips/tips-how-to-convert-VHS-to-DVD.asp

How to Convert 8mm, Super 8, Single 8 and 16MM to DVD

Do you by chance have 8mm movies of when you were children? You still have the projector and they are fun to watch. Would you like to convert them to digital images? There are several methods for you to consider.

Capture using DV camera. The best way to make the transfer, short of paying extremely high fees to capture the film frame-by-frame is using a DV camera to reshoot the image as it projects on a screen. The focus of this section will be on how to capture film yourself and convert to DVD.

Service for fee. These services will transferring 8mm, super 8mm and 16mm movie film to digital. There are different types of processes used. The one I prefer is either a high-definition or standard-definition frame-by-frame transfer service . Each individual frame of film is individually captured as a still image and later assembled into an uncompressed video file. This enables the output to be transferred to any frame rate without flicker or blended frames. With the absence of a mirror, screen, or box, this process produces extremely vibrant images without any loss in color fidelity.

Some of the other benefits are:
- Steady frame registration
- Perfect image focus
- Flicker free images
- No blended frames
- Improved image clarity
- Frame rate independence
- Even light illumination

Services for example include:
- Transfer of film to digital
- Splicing (if necessary)
- Editing out of blank spots, beginning and end leaders, etc.
- Opening and closing transition (DVD Only)
- Encoding to MPEG2 (DVD Only)
- Correction for upside-down reels
- Sound Capture

Pricing is usually based on:
- How many total feet of film do you have (or how many reels, and what size are they)?
- How many DVD copies will you need?
- Would you like to purchase the optional mini DV master cassette(s)?
- Shipping

Step by Step Conversion of film to DVD

What's needed?

The following items are needed for the conversion:

- 8mm film projector preferably one that has at least a three bladed shutter and variable speed control.
- New bulb for projector.
- A smooth screen, textureless white wall, white sheet of paper with at least #92 brightness.
- a digital video camera that has variable exposure and shutter speed control.
- a tripod for the camera

Projector and DV Camcorder Setup

1. Make sure the film projector is dust free and clean the screen to get the best possible image from the projected film. Best results will be achieved using white sheet of paper with at least a #92 white brightness affixed to the wall.
2. Make sure to adjust the projection lens so that the image is as small and tightly focused as possible. This is vital to getting the best possible DV recording from the 8mm. Shooting the 8MM image in the smallest possible space will result in the best quality image in your DV recording.

   The reason you need a film projector with variable speed control and multi-bladed shutter and a camcorder with variable exposure and shutter speeds is that the film rate for 8mm film is usually 18 frames per second and the frame rate of the camcorder is 30 frames per second. If you don't compensate for this you will see frame skips and jumps on the video after it is recorded, as well as a variable flicker. With variable speed and shutter control, you can compensate for this enough to make your film to video transfer look smoother in appearance. In addition, when transferring film to video, you also need to be able to adjust the aperture of the camcorder to match more closely to the original film brightness.

   In order to get rid of the flicker for films that were shot at 18 frames-per-second (which is the normal amateur filming speed), the projector has to run at about 20fps, which is slightly faster. Using a variable speed projector, you slowly adjust the speed on it until you no longer see any flicker in the video camera's viewfinder. When you load your film into the projector, it will be under 'load' so you will have to again fine-tune the speed upward a tad to get rid of any flicker. Trial and error will show you the way here.

3. To capture the projection, set up your DV camcorder on a tripod next to the film projector, with the least possible angle between the projector and DV cam, without putting the projector in the DV camera's field of vision. Shoot a short test, then remove the tape, and place it into a VCR and watch it on your TV to make sure you have completely filled the frame and can't see any rough edges all around the sides. The cameras aren't that accurate, so you will want to definitely conduct the playback test, prior to spending all the time it will take to transfer your films!

Capturing the image with DV Camcorder
1. Start the projector and run a few minutes of film to give you time to configure the DV camera.
2. Zoom in tight on the projection, eliminating as much of the surrounding screen area as possible from the edge of the 8MM film.
3. Once you get the picture tightly in focus, rewind the 8MM film, start playback over and initiate recording. Be careful not to move the projector or the camera at this stage of the process so you don't need to start over.

Capturing Sound with the DV Camcorder
1. For best results in capturing sound from an 8MM film, connect the sound output on the projector to the audio on the DV camcorder.
2. Many of these projectors may not have an output, but it's best to isolate any audio track on the film from the noise generated by the fan and motor on the projector.
3. If the film does not have an audio track, plug a mini-jack adapter into the audio input on the DV cam or mute the DV cam audio input to prevent fan noise.

Transfer DV Camcorder Tape to PC
1. Connect the DV camcorder to your computer using the USB or FireWire connection on the camera (also referred to as iLINK or IEEE1394).
2. Launch your favorite video editing application and follow the directions for importing digital video from a camera. If you use an application like MyDVD, Roxio Easy Media Creator or Premiere Elements, the DVD authoring components are built right in, complete with menu templates for creating something polished.
3. Of course, Mac users have access to the iMovie/iDVD combination.

For further information consider:
- Book: Easy Digital Home Movies, By Jake Ludington

- Transferring Old 8mm Film Movies To DVD or VHS
  http://hometheater.about.com/od/videoediting/qt/filmtovideo.htm

- Convert Super 8mm/16mm Movies to DVD
  http://www.jakeludington.com/ask_jake/20050311_convert_8mm_movies_to_dvd.html

So You Don't Have a Variable Speed Projector?
You will be able to acquire a projector on eBay. It may take some hard bidding but you will be able to find one. If the cost of the projector is more than you want to pay, be assured there will be others. You can also find many used items in the SHUTTERBUG magazine (available at most newsstands worldwide). The lamps sometimes don't survive in shipping, but you can get a new bulb at several sources anyhow...and it's best to start your transfer project with a fresh bulb anyhow. A good variable speed projector will cost you in the $100 to $200 range, sometimes high end ones are more ($200 to $500). When you are done with the project you can turn around and sell it on eBay and recoup your costs.

Audio Recordings

Audio recording began in 1877 with tin foil on a cylinder, which was commercialized with the introduction of the wax cylinder recorder by Thomas Edison. Since that time audio recording devices have gone through a series of technological advances. Commonly encountered recording media are summarized below. It is possible to digitally reformat any of these audio materials. Audio quality will vary based on the type of device and the quality of the original recording, but with modern computer based audio editing software it is possible to "clean up" the audio within limits determined by the original audio quality and the software employed.

Format	Description	Years in Use
Wax Cylinder Records	About 2 - 4 minutes, wax or wax compound	1877 - 1929
Recordable Disc Records (Direct or Acetate Discs)	7, 12 or 16" recorded at 33 1/3 or 78. Generally vinyl on a paper, glass or metal base.	1929 - 1960s
Recording Wire	Spooled wire, usually in 15 - 30 minute lengths, one direction only.	c1945 - 1955
Open reel recording tape	1/4" - 2 inch, 3 - 10 1/2" reels, 15/16- 30 IPS (inches per second) speeds	c1945 - Present
Compact Cassette	1/8" tape in hard case. 1 7/8 IPS format (also 15/16 & 3 ¾)	1965 - Present
Microcassette / MiniCassette	Very small 2 – 4 cm cassette tapes.	1977 - Present
Digital disk,MP3 and other digital recorders	Audio recorded directly in digital files to optical disks or internal hard drives.	1984 – Present

Sample Rate and Bit Depth

Sample rate defines the number of samples that are recorded per second. It is measured in Hertz (cycles per second) or Kilohertz (thousand cycles per second). The following table describes four common benchmarks for audio quality. These offer gradually improving quality, at the expense of file size.

Description of the Various Sample Frequencies Available

Samples per second	Description
8kHz	Telephone quality
11kHz	At 8 bits, mono produces passable voice at a reasonable size.
22kHz	22k, half of the CD sampling rate. At 8 bits, mono, good for a mix of speech and music.
44.1kHz	Standard audio CD sampling rate. A standard for 16-bit linear signed mono and stereo file formats.

Bit-rate indicates the amount of audio data being transferred at a given time. The bit-rate can be recorded in two ways - variable or constant. A variable bit-rate creates smaller files by removing inaudible sound. It is therefore suited to Internet distribution in which bandwidth is a consideration. A constant bit-rate, in comparison, records audio data at a set rate irrespective of the content. This produces a replica of an analogue recording, even reproducing potentially unnecessary sounds. As a result, file size is significantly larger than those encoded with variable bit-rates.

Indication of Audio Quality Expected with Different Bit-rates

Bit rate	Quality	MB/min
1411	CD quality	10.584
192	Good CD quality	1.44
128	Near CD quality	0.96
112	Near CD quality	0.84
64	FM quality	0.48
32	AM quality	0.24
16	Short-wave quality	0.12

The majority of audio formats use lossy compression to reduce file size by removing superfluous audio data. Master audio files should ideally be stored in a lossless format to preserve all audio data.

Common Digital Audio Formats

Format	Compression	Streaming support	Bit-rate	Popularity
MPEG Audio Layer III (MP3)	Lossy	Yes	Variable	Common on all platforms
Mp3PRO (MP3)	Lossy	Yes	Variable	Limited support
Ogg Vorbis (OGG)	Lossy	Yes	Variable	Limited support
RealAudio (RA)	Lossy	Yes	Variable	Popular for streaming
Microsoft wave (WAV)	Lossless	Yes	Constant	Primarily for Windows
Windows Media (WMA)	Lossy	Yes	Variable	Primarily for Windows

Conversion between digital audio formats can be complex. If you are producing audio content for Internet distribution, a lossless-to-lossy (e.g. WAV to MP3) conversion will significantly reduce bandwidth usage. Only lossless-to-lossy conversion is advised. The conversion process of lossy-to-lossy will further degrade audio quality by removing additional data, producing unexpected results.

Pros and Cons of Sample Rates and Bid Depths
Sample Rates. As you digitally record your audio there are two acceptable choices: 96 kHz and 44.1 kHz. The 96 kHz sample rate is accepted as the standard for archive preservation. If you are not limited by your computer processing resources, then seriously consider using 96kHz otherwise go with 44.1 kHz.

Bit Depth. The selection of a bit depth is the second critical factor in determining the audio fidelity of the digitally reformatted audio. Adhering to the professional standard 24 bit depth is recommended.

Comparison of Pros and Cons of Sample Rates and Bit Depths

	Sample Rate	Bit Depth	Pros	Cons
Minimum	44.1 kHz	16 bit	No file format conversion needed for Audio CD. Maximizes storage space. Appropriate for lower quality source files. Lowest level of processing time. Ubiquitous home audio standard. International standard for Compact Disk (Red Book Standard)	Lowest frequency range acceptable. May not provide sufficient quality for future formats. May have limitations for publication or broadcast, and migration to future digital formats. Limits ability to enhance source file for delivery.
Recommended	44.1 kHz	24 bit	More accurately reproduces sound of source material. Increased capability to enhance source file for delivery. Increased dynamic range. Acceptable for publication and broadcast. Reflects current professional audio standards.	

Optimal	96 kHz	24 bit	Standard for DVD/HD Audio.	Increased storage space.
			Increased frequency range.	Increased processing time.
			More accurately reproduces sound of high frequency, high quality source material, such as musical recordings.	No perceptible improvement in sound quality for some source files.
			Increased potential for enhancement of source file for delivery.	Requires conversion to 16 bit and 44.1kHz for delivery on Red Book Audio CD.
			More potential for future applications.	May require frequency compression for delivery.
			Potential recommended benchmark for future.	
			Highest recommended current quality.	
			Rapidly growing acceptance.	
			Reflects emerging professional audio standards.	

File Size in Megabytes

Sample Rate kHz	Bit Resolution	No. of Channels	File Size Megabytes	File Size Gigabytes
44.1 kHz	16	2 (stereo)	591 mb	0.59 gb
44.1 kHz	16	1 (mono)	296 mb	0.30 gb
44.1 kHz	24	2 (stereo)	887 mb	0.87 gb
44.1 kHz	24	1 (mono)	444 mb	0.44 gb
96 kHz	24	2 (stereo)	1931 mb	1.93 gb
96 kHz	24	1 (mono)	966 mb	0.97 gb
This table represents the file sizes for 1 hour of digitized audio at different sample rates and bit resolutions.				

Audio File Types

As you convert to digital audio files, remember there are many file types available. As you consider file types, you are looking to choose those that can be read by a variety of software. File types that compress the audio file should be avoided for preservation masters. Both of the following file types are uncompressed and acceptable for long-term file storage.

WAV. WAV file type was developed by Microsoft, is in widespread use, and is readable by virtually all audio software programs. WAV file type has become a standard and is recommended. In addition, the WAV file type is also available in a professional flavor, broadcast WAV (BWF), which has the 20capability to store metadata in the file header. Although not all audio software programs are currently capable of reading or writing to the metadata header, the BWF format is emerging as the WAV file type of preference for archival audio projects.

AIF. AIFfile type was developed by Apple Computer and is also in widespread use.

With the emergence of compact hand-held digital recording devices, a number of other formats have become very popular. Although compressed file types are ideal for Web applications, none are recommended for long-term storage.

MP3. MP3 format has become the file type of choice for many applications requiring downloads or uploads to the Web. This format has the advantage of being highly compressed for electronic transfer, but also has the disadvantages of compressed formats.

Windows Media, and Real Audio, and Quicktime. Windows Media, and Real Audio and Quicktime for streaming downloads. Caution should be taken to avoid the proprietary formats of many of the hand-held media players.

How to Convert Your Vinyl LPs and Singles to CD

Do you have your favorite LPs (78 rpm, 33 rpm, and 45 rpm) that belonged to your Mom or do have your own collection that you would like to put on CD or MP3? Many old 78s and LPs are irreplaceable, so it pays to preserve them in a digital format. With a good sound-recording and sound-editing program you can take those old scratchy LPs and 78s and record them through your sound card and then burn the music to an audio CD or store it as an MP3 file. You can even filter out all those clicks and pops.

Step by Step

Install recording and editing software on your computer. The standard sound recorder application that comes with most PCs will not enable you to record an LP to your hard drive. There are, however, a variety of programs that record audio, ranging from freeware to very expensive professional editing software. Many of the software programs downloadable demo versions for you to use for a period of time. A good rule of thumb is try before you buy. Some of these obviously work better than others, and some have more features, but in general you want a program that writes files directly to the hard drive and that enables you to do some minor editing of the recorded files. Examples of software would be:

- Sound Forge   http://www.sonymediasoftware.com
- GoldWave   www.goldwave.com
- Adobe Audition www.adobe.com
- WaveLab   www.steinberg.net

Connect adapter cable

1. Connect an adapter cable from the tape out (or record) jack of your stereo receiver to the line input of your sound card.
   - Determine whether you need a preamp.
   - You will need to amplify and equalize the sound from your turntable in order to record it onto your computer.
   - If your turntable has a built-in preamp, you should be able to plug it directly into your computer's sound card.
   - If you don't have a built-in preamp, you can either plug the turntable into a stereo receiver and plug the receiver into your computer sound card, or you can purchase a preamp--you can get these at most computer, audio or electronics stores--and plug your turntable into that.
   - Make sure you buy a preamp with "RIAA Equalization" and it is necessary for LPs made after about 1950.
   - Note about cables: You may need to purchase standard RCA cables (if you don't have them already) to connect all the components. Depending on the type of input and output jacks you have on your sound card, turntable, preamp and receiver, you may also need converters to allow you to connect each component to the next. Any audio or electronic store like Radio Shack should have them.
   - Note about connecting components. If you are not using a preamp you'll need to run a cable from the headphone or "audio out" jack on the turntable or stereo to the input or "line in" jack on your computer's sound card. If you have a preamp, connect the cable from the turntable to the "line in" jack on the preamp and then connect another

cable from the "audio out" jack on the preamp to the "line in" jack on the computer sound card.

2. Hardware and Software Tips
   - If you don't already have good recording equipment and software, and you just want to record a few LPs, you really might be better off just buying the CDs. You may be surprised how many old LPs are now available on CD. Unless you have a large vinyl collection or LPs that can't be found on CD, it might not be worth the time and expense to record your LPs yourself.
   - You may be able to skip the computer and sound card altogether if you get a good CD-RW recorder. These can be connected directly to your stereo receiver so that you can record LPs onto CDs as easily as you used to record onto cassette tapes. If you want to edit the recording, you can simply use your CD to transfer the files to your computer and burn additional copies with your computer's CD burner.
   - Get the right turntable. If you have a record collection, you've probably got a turntable. While you'll be able to make your recording using almost any turntable, the quality of your finished CD depends heavily on the quality of your equipment. The pawnshop-special record player in your basement may not be suitable for recording purposes.
   - Get the right sound card. You don't need a professional-quality sound card to make a good recording, but the standard-issue cards that come with many computers just won't do. If you already have a sound card, try recording with it. It could be fine, or you might want to upgrade.
   - If you used a freeware program, it will probably save in mp3 or wmv form, but if you use Microsoft Plus, it will save as a Windows Media file, which you can convert to mp4 using iTunes or burn directly to a CD with Windows Media Player. Because mp3 is a lossy format where some data is thrown out, save to .aiff or .wav with no compression. In Mac OS, .aiff is CD quality audio, .wav is the closest possible on a PC.
   - If you have a laptop, it may not be feasible to use a sound card. In this case, you can utilize a USB audio interface device. As with all the equipment, these vary in quality, so shop around and read reviews before buying.

3. Hardware and Software Warnings
   - Turntables are extremely sensitive to vibration. Of course you can expect the LP to skip if you bump the table it's on, but other less harsh vibrations can also affect your sound quality. While recording, try to minimize background noise--make the room as soundproof as possible and step lightly.
   - Do not hook up your computer sound card to a speaker output on your stereo receiver. The signal from a speaker output is likely too powerful, and it could cause serious damage to the sound card.
   - Power down either the computer and/or the audio source before the final connection. The intial surge can damage circuits with some combinations of sound card and audio source. Sound cards are especially sensitive to this damage.
   - If hardware installation is needed, be sure to take the usual precautions: turn off power to the computer, "ground" yourself by touching something else metal before touching the inside of the computer case and make back-ups of any critical information stored on your computer (i.e., "the next great novel" that you've been writing) by either copying to a 3.5" floppy or e-mailing the file to a friend or relative.

Clean the LP
1. Before you start, you should do your best to clean the record as thoroughly as possible; getting dust and gunge out of the grooves will eliminate a fair amount of the lower level noise that would otherwise require a very time-consuming job to remove at a later stage. A clean record plays a lot better than a dirty one, and if you're making a recording you want the vinyl to sound its best.
2. Your best bet is to use a professional LP-cleaning machine, but these can be expensive and hard to find (you can get similar results, however, if you have a wet-dry vacuum cleaner and some cleaning solution).
3. You can also wash records in the kitchen sink or use specially-designed brushes to clear surface dust. You want to be very careful cleaning your records, and there are more tips and warnings than can be listed here, so check out the external links for more information.

Create new file
1. Create a new file in the sound-editing program you're using. If you intend to create an audio CD, you must choose a sample rate of 44,100, two channels (stereo), and a resolution of 16 bits. This will create a file that takes up approximately 10MB of space for every minute recorded, so you will need plenty of free disk space.

2. For voice or music to be embedded in a webpage, you can use a lower sample rate, a single channel, and 8-bit resolution to create a much smaller file.

Set volume control
Play part of the track and use the volume control program to set your recording levels. In Windows, the first screen of the volume control program is for playback levels. To get to the recording level screen:
1. Choose Properties from the Options menu.
2. Select the check box for Recording.
3. Make sure the check box for line-in volume control is also selected.
4. Click OK and the record level screen will appear.

Set record level
1. Set the Monitor Record Level option in your recording program to On, and, as the track plays, adjust the slider for line-in so the level meter shows a strong signal, but not too strong, because any peaks will cause the meter to go into the red area.

Record
Before you record an entire album, experiment with a short clip so you can determine which settings work best for different types of recordings. Write the settings down for future reference.
1. Be sure all background applications are turned off while you record.
2. Lift the stylus and queue up the beginning of the track.
3. Click the record button in your recording program.
4. Lower the needle to the album.
5. When the track is finished, click the Stop button and lift the stylus.

Editing--Playback

Play back the track to hear how it sounds. Trim off any silence at the beginning and ends of the track. If you have an audio cleanup plug-in, use it to automatically remove any clicks, pops, and hiss. If you don't have an audio cleanup plug-in, try this:

1. Zoom in to each click or pop.
2. Select an adjacent cycle of the waveform at the zero crossing points.
3. Copy it to the clipboard.
4. Paste it over the cycle that contains the click.
5. Listen to the track again and run the hiss removal if necessary.

Editing--Normalize

1. Normalize the track to adjust the volume up or down so that all tracks will play at a similar level. A value of 97 percent usually works well if your software normalizes by peak level.
2. More advanced programs, such as Soundforge, can normalize by average levels, which is much more accurate.

Editing--Fades

1. You may want to add a fade-in or fade-out. Some CD recording programs, such as Nero, can automatically crossfade tracks as the CD is recorded.

Editing--Tips

- If you used a freeware program, it will probably save in mp3 or wmv form, but if you use Microsoft Plus, it will save as a Windows Media file, which you can convert to mp4 using iTunes or burn directly to a CD with Windows Media Player. Because mp3 is a lossy format where some data is thrown out, save to .aiff or .wav with no compression. In Mac OS, .aiff is CD quality audio, .wav is the closest possible on a PC.
- When editing, feel free to play around with your software's noise reduction and equalizer tools until you get a good sound. This will usually involve a bit of trial and error, so you should always make sure to save the original recording unaltered and then rename edited files. That way, if your editing actually worsens the sound quality you can always go back to the original and start again without having to re-record the LP.
- There are CD-Rs that have the look and feel of vinyl, which are relatively inexpensive.

Save files

1. If you intend to record the track to an audio CD, save it to a PCM format WAV file (PC) or an AIFF file (Mac). Save the file to MP3 format if you want to play it from your computer or on a portable player.
2. I like to save my music as mp3, because it reduces file sizes from about 30Mb to about 3Mb, with virtually imperceptible loss of quality.

Care and Cleaning of 78s

Un-warping
1. Place the record between two sheets of plate glass (or any completely flat surface of moderate weight.)
2. DO NOT place any additional weight, add heat, place them in the sun, etc.
3. Putting additional weight on the record will cause the peaks between the grooves to flatten out somewhat, causing distortion during playback, and heat can cause the shellac to soften considerably, causing all kinds of problems.
4. Remember "less is more" school on dewarping; unless a record is unplayable, I don't worry about it.

Cracks
1. Prevent incipient cracks from spreading by fusing the edge of the recording where the crack starts with a match.
2. Scotch taping the edge with several tight layers also helps.
3. Playback of cracked records can be aided by slightly elevating the part of the crack the needle travels over first with a piece of paper placed along the rim of the record.
4. Move the paper(s) along the edge until an optimal sound is achieved.

Cleaning of 78s
1. Records – Shellac.
   - Fill a large bowl with barely warm water and add a mild detergent such as Ivory. Leave the faucet running slowly.
   - Wet a wash cloth and the record's playing surface with this solution, very gently wiping the surface with the cloth in the direction of the grooves.
   - Let the solution run along the grooves in an effort to loosen dirt, grime, and wash away any iron filings.
   - Rinse the record under the slowing running warm-water tap, then gently pad the record dry with a dry towel.
   - Let the record stand overnight to dry completely - Mold spots or worse will occur if they are placed in your collection damp.
   - Do not let the label come in direct contact with water or the solution. Some people swear that a mixture of 25% Windex and 75% water will remove even more grime and oil.
   - Other commonly used solutions involve Kodak Photo-flo diluted with distilled water.
   - Apply it with a towel, an old LP "thousand bristle" brush, or a soft velvet applicator (after the Ivory treatment) and rinse again.
   - Photo-Flo is intended to prevent water spots from forming on film as it dries. It is not intended to be a cleaner, however its detergent-like properties for breaking down the surface tension of water do make it effective as a mild cleaner in some cases and may help the record dry safer without rinsing as rinsing may leave behind whatever contaminants the water may contain.

2. Records - Edison Diamond Discs. As the record jacket suggests, do not use water, but an alcohol solution.

3. Records - Acetates (Records, etc.). These can be degreased with an organic solvent with minimal effects on the acetate or nitrate surfaces. Unfortunately, cellulose acetate and nitrate can be dissolved by the wrong organic solvent. Mineral spirits would degrease and might be safe, except that they may leave their own residue. If there is any separation of acetate from base, water is dangerous and maybe other solvents which can get between the layers by capillary action and further separate them. Lighter fluid has been used effectively. Others have mentioned this procedure: 1) Apply mineral oil to entire surface with a soft cloth. 2) Squirt on some Photoflow and Ivory soap. 3) Lather. 4) Rinse. 5) Dry with a Monks machine or use a soft cloth and allow to air dry.

A few NEVERs
1. Never play your 78s wet!
2. Never use water on Edison Diamond Discs, Acetates, Hit of the Week, or any other odd-material records.
3. Many record cleaning solutions intended for LPs contain alcohol and will destroy shellac 78s. Discwasher D4 fluid is safe, however.

Labels
1. Keep the label dry!
2. Never wet a label unless it is so soiled that other methods won't remove the dirt.
3. Many labels will "bubble" if dampened, particularly Victor, Emerson, Paramount, and other glossy types.
4. For some collectors, this can degrade the record's value.
5. Try cleaning dusty labels with a dry sable brush. Dirtier labels can be cleaned by buffing gently with a soft towel or piece of corduroy.
6. A kneaded artists eraser (available at any art supply store) is also a safe way to remove dirt or stains without dampening.
7. If you must use water, apply it very sparingly with a slightly moistened towel and dry immediately.

Playback Tips
1. Even with a new needle and a properly rebuilt, compliant reproducer, a certain amount of damage is unavoidable.
2. Always discourage people from playing truly rare records on vintage equipment; we owe it to posterity to be good custodians of these treasures!
3. Make sure your tonearm is properly weighted and tracking is easy.
4. As the record jacket says, "Permanent needles do permanent damage!"
5. Change your needles every time if you have steel, bamboo, tungs-tone, etc. needles.
6. Even diamond needles need replacing more often than people think (and sapphire much more often.)
7. Different manufacturers during different time-periods used different sized grooves - use the one that fits. Speaking of which, truncated elliptical styli play the mostly-undisturbed sound recorded on a higher spot on the groove wall, which is where the sound was recorded on a mono, lateral record. They also tend not to skate on the bottom of the groove where no sound (except hiss) resides. The opposite is, of course, true for vertical-cut records.

Disc Slips
1. Try double-stick tape, the kind with an adhesive on both sides.
2. Look for one that is re-usable in hopes that it sticks well but can be easily removed without damaging the record.
3. Try Scotch Removable Poster tape or even DAP "Fun-Tak Reusable Adhesive" which is a putty-like substance, easy to remove, but sticks well enough for the purpose of flattening out a flexible phono record. Need a more rigid surface to stick the record to? Consider sticking it to a rigid record, although there are drawbacks to this as you might imagine.

Cleaning Vinyls
It might sound simple but keeping your records clean is the easy, inexpensive method of preserving your vinyl. There are three commonly used methods:

Vinyl Records using commercially available cleaning solution.
1. A quality disc cleaning solution is inexpensive and really helps protect vinyl discs. The best way to clean records is by buying a commercially available record cleaning solution such as Last or Discwasher D4 (Discwasher IV is what the Library of Congress recommends), which usually come with an applicator brush.
2. To begin, lay the record on a clean flat surface such as on a soft towel on a table or place the record on the turntable platter. Note: If you decide to clean your records while they are on the turntable make sure to secure the tone arm so it doesn't accidentally swing across the record as you are cleaning it and do not apply too much pressure on the platter as you can damage the bearings. Also pay attention not to get any record cleaning fluid on the platter or turntable finish.
3. Follow the directions on the bottle, but generally one applies the liquid to the applicator brush and not on the record itself.
4. Take the brush and place it on top of the record and turn the platter counter clockwise a few times to work the dirt loose.
5. Look at the brush, you should see some dirt or lint on it so carefully remove it and go another round cleaning the record till no more dirt or crud appears on the brush.
6. Since alcohol is the primary ingredient of most record cleaning solutions the record should dry fairly quickly, but do let it air dry before flipping it over to clean the other side or place it back in its sleeve.
7. Before you flip the record over though make sure the surface or platter is clean as the dirty uncleaned side was just there

Cleaning Vinyls with vacuum-type systems
The process is simple; liquid record cleaning machine (RCM) fluid is placed on the record and a hand-held brush is used to scrub the grooves, working the fluid into the deepest recesses, bringing contaminants into solution. The key to the process, however, is the vacuum, which removes all traces of fluid, leaving no residue and a scrupulously clean surface.

The vacuum record cleaning machine is without a doubt, the most effective method of deep-cleaning LP's, and VPI is clearly the leader in both price and performance. If you can justified the expense, depending on how many records you own, a Vacuum cleaning system is a good

investment,   Examples of vacuum cleaning systems are the Nitty-Gritty or the VPI which really get to the bottom of the groove. It works exactly like a record player.

1. You place the record on the platter and clamp it down just like any VPI turntable.
2. Then you squeeze some cleaning fluid from a bottle onto the rotating record/platter, then apply a brush.
3. You just hold down on the brush, the record rotates beneath it,
4. Now you swing over a spring loaded vacuum "Tonearm" assembly which spans the record and flip on the vacuum switch.
5. The suction actually lowers the mechanism to the record and, again, the record rotates underneath it.
6. All water and debris is swept up though a slot running the length of this arm.

Warnings

Exercise the utmost care when cleaning an LP. LPs are actually quite resilient, but even the smallest scratch can produce popping or hissing noises, and once you've damaged the vinyl it can be difficult or impossible to repair. If you're not sure what you're doing, ask the staff of your local record store or do some research online.

Vinyl Records using Your Own Solution

1. A generally accepted recipe for cleaning your vinyl is as follows:
    - 3 parts distilled water (triple distilled, de-ionized)
    - 1 part Isopropyl alcohol, 70% commonly available but 91% lab grade preferred.
    - A few drops of photographic wetting agent – if possible Triton X-100, Triton X-110 or Triton X-115 or Monolan 2000, not Kodak Photoflo which is 'reputed' to leave a residue (though used by some). Recommended is 12 drops per gallon or 2-3 drops per litre, though some use up to 8 drops per litre. If you add too much, the fluid gets sudsy on the record.
2. Follow the process as outlined with Cleaning of 78s--Records – Shellac.

Copyright Issues to Remember

Make sure you either have permission or own the music you are copying and do not violate copyright laws.

1. As you set out to digitally convert your Vinyl LP and single collection, remember it is legal to make copies of your own records and tapes for your own use. It is not legal to sell them or post them on your web site for millions of your friends to download.
2. It is not legal to keep copies of your records and CDs if you sell the originals. That is piracy, albeit on a small scale.
3. Using a short snippet of a song as part of a new creative work such as a web page, would incur the need to pay royalties. So be cautious.
4. You are also not likely to be challenged if you make copies of old material that is no longer in print, so long as you don't sell the copies or distribute them indiscriminately. The recording industry has a long tradition of tolerating and even encouraging this kind of activity because it tends to preserve and even create markets.

How to Burn A CD

There are a number of ways you can record data on a CD. You can copy your data, songs, videos, and images onto a CD, using CD burner software. Here are the specific guidelines to record data on a CD.

Step by Step Instructions
1. You must have a CD writer drive installed on your machine (or accessible through the network).
2. You must have a writable CD disk of a good brand. Writable CD disks have a CD-R label on them.
3. Install the CD burner software that is usually shipped with your CD writer drive. Alternatively, you can use any popular CD burner software (such as Nero).
4. Insert the CD into the CD writer. In many cases, this will automatically launch your CD burner software. If it does not, you can run the software manually. All the CD burner software titles usually have the same interface and follow the same procedures.
5. Run the CD copy wizard, and select "Compile New CD."
6. Select the type of CD you want to create (Data CD, Audio CD, or Others).
7. Add the files that you want to record. You can add or remove files from the software explorer window.
8. Click on "Write CD." This wizard may ask you few more questions.
9. The CD will start burning. Do not interrupt this process.
10. Once the burning is finished, remove the CD from the tray and label it appropriately.

Tips
1. You can also use Real Player to burn audio CDs.
2. If you want to frequently over-write the data on your CD, use a re-writable (CD-RW) disk, but they are much more expensive and operate at a slower speed. If you use CD-R (write-once) discs, you cannot re-record over your data because it's permanent. In this case, you may want to buy a Compact Disc Eraser to securely wipe out those personal or confidential discs.
3. If you are new to CD recording, try using the step-by-step CD copying wizard that comes with your software.

How to Burn a CD Using Windows Media Player 9

The following discusses how to burn a music CD using Windows Media Player 9. (Note: This how-to assumes you have basic knowledge of using Microsoft Windows XP.)

Step by Step Instructions
1. Open Windows Media Player. The icon can commonly be found by clicking the "START" button, then "Program Files" then "Accessories" then "Entertainment." There you should find the icon for Windows Media Player.
2. Click on the "Media Library" button located on the left side of the window.
3. Select the files (e.g., you want burned to a CD. Click on the "All Music" tab located in the left window. The right window should now display all the songs you have saved on your hard drive.
4. Select the songs you want to copy to a CD. This can be done a couple of different ways. You can right click a song, choose "Copy to CD or device," then go back to the "Media Library" and pick more files this way. You can also select multiple songs at once by

holding down your keyboards CTRL key while you click on files/songs. This lets you highlight many files/songs. You can also pick the first song in the list, then while you hold down your keyboards SHIFT key, click on the last song. This highlights every track from the first song you click to the last file/song you clicked.

5. Once you have the files/songs you want selected, right click on one of the selected songs and choose "Copy to CD or device." This brings you to the "Copy to CD or Device" menu. On the left side window, you will see all the song tracks you have chosen to burn, and on the right hand side, a blank window that says "Insert a blank CD into the drive." In the left hand window, you will see little check boxes next to the tracks. You can check and uncheck files/songs that you want or don't want burned to the CD. You can also change the order the songs will be played by clicking on a track, and while holding down the mouse button, dragging the file/song up or down the playlist.

6. Click the "Copy" button in the upper right hand corner of Windows Media Player. A window will pop up letting you know you need to insert a blank CD-R or CD-RW into your CD drive. Place a blank CD-R into the computer's CD-R drive, and click the retry button. At this point, Windows Media Player should start burning the CD. You should see progress bars scrolling next to each track on the left hand side. Media Player is converting the tracks to a special CD format. Don't worry, it's not doing anything to your original files. Once all the tracks have been converted, progress bars will start to scroll next to each track that says "Copying to CD." The right window should say "Copy in progress".

7. And that's it, you're done! Windows should automatically eject the newly created music CD once it has finished burning. If the CD isn't automatically ejected, you can eject it yourself, but only after you are sure the burning process is complete.

Tips
1. You can put a blank CD-R or CD-RW into your computer's CD-ROM drive at any time before you click the "Copy" button.

Warnings
1. Generally, you shouldn't use your computer much while the CD is burning. Too much hard drive activity caused by other programs can ruin the CD.

How to Digitize Cassette Tapes to CD

Audio cassettes opened up a world of portability unimaginable in the days when LPs ruled the roost. Now, however, cassette tapes have fallen by the wayside (or, in many cases, have been thrown to the wayside from moving vehicles), and, unlike LPs, they don't look to make a comeback anytime soon. This poses a problem for those of us who would like to preserve important conversations or good songs that are currently stored on cassettes, not only because audio cassettes eventually deteriorate or get "eaten" by your tape player, but also because cassette players are becoming increasingly rare.

Converting cassettes to digital files is almost exactly the same process as converting vinyl LPs to CD. The real difference is we use a cassette deck vs. a turn table. The following is a very brief outline of the recording process. For more in-depth detail see "How to Convert Your Vinyl LPs and Singles to CD—Step by Step," process.

What's needed?

Fortunately, you can easily transfer audio from cassettes to your computer, where it can be stored in formats such as WAV and MP3 or can be burned to CDs. In fact, $6 could get you everything you need. The following is the entire list:

The following items are needed for the conversion. You probably have everything
- Cassette Deck
- Computer with sufficient hard disk (to store the .wav files) and RAM (to edit and process the files)
- CD Writer
- Soundcard
- Audio Recording Software & Noise Reduction Software or Plug-in (Optional)
- CD Authoring Software
- Interconnect cables for connection between the cassette deck and the soundcard
  - A "Y" stereo adapter cable with a pair of RCA-style channel connectors (one is usually red, the other white) at one end, and a single line-in, 1/8-inch (3.5 millimeter) mini-connector at the other. This is also called a 3.5mm Stereo to RCA Dual Audio Cable. You can probably pick it up for about $6 at a "big box" retailer or local store.

    or

    A regular stereo hook-up cable with RCA connectors at both ends and (2) a 3.55 mm mini-connector adapter. With this setup, you plug the RCA connectors at one end into the cassette deck's line-out jacks and then plug the connectors at the other end into the adaptor, which has a 3.5 mm mini-connector at the other end to plug into your sound card's line-out jack.

    or

  - (1) A regular stereo hook-up cable with RCA connectors at both ends and (2) a RCA-to-USB audio interface (converter). With this setup you connect the

RCA cable to the converter, which has a USB plug to connect to your computer's USB port.

- o A PC with a sound card that has a line-in jack. Almost all computers have this device, except for some laptop computers that do not have a line-in jack. In this case, you may need to use the USB interface.

Step by Step Instructions
1. Connect the LINE OUT of the Cassette deck to the LINE IN of the Computer Soundcard.
2. Select the soundcard as the preferred recording device (under control panel - multimedia icon).
3. Ensure the LINE IN Fader on the audio mixer of the computer is not muted.
4. Launch the audio recording software.
5. Depending on the software used, activate and check all the settings to allow recording.
6. If possible, monitor the incoming signal from the cassette deck using the audio software to ensure the incoming signal is not clipping (Too Hot; Levels Too High).
7. Set the appropriate levels for recording and rewind the cassette tape.
8. Activate the recording on the computer and playback the cassette tape.
9. Once the material on the cassette tape has been recorded into the computer, save the material as .WAV format and edit your recording. You may not need to do any editing, but if you want to cut out silences, erase some tracks, or change the volume, for example, most sound-recording programs will allow you to do so. When editing, it is a good idea to keep the original file as a backup and change the names of edited files when you save them in case you find you made a mistake. When you're sure you like the edited file, you can delete the original to save memory space on your computer.
10. When all editing has been completed, the number of .wav files should correspond to the number of songs on the cassette, unless some songs have been omitted.
11. Next, close the audio recording software (be sure to save all your work) and launch the CD authoring software.
12. Select for audio CD writing and import the .wav files and arrange them according to the sequence required. (Exact procedure of import would be dependent on the software used.)
13. Load in a blank CDR disc and write to the disc using disc-at-once mode and finalized as a CD-DA format (Exact procedure of writing would be dependent on the software used).
14. Burn audio to CD if desired.

Tips
1. The audio file you created is probably in the WAV (".wav") format. You can play it with almost any audio software. These files, however, are quite large, so you will probably want to compress them to MP3 or some other format. Your sound recording software may have this function built in, or you may need to get additional software. Fortunately, you can get such conversion software free online.

Warnings
1. The WAV format audio files are cumbersome. One cassette tape may take hundreds of MB, so make sure you have enough space on your hard drive.
2. Take care not to violate copyright laws with your recordings. Cassette tapes may be old, but the copyright is usually still enforceable.

How to Care for Magnetic Media

(Reels, Cartridges and Cassettes)

Because many of the tapes magnetic media I have for my family history surrounds irreplaceable moments in time and interviews with family members, I tend to look at these tapes as source documents. As I make digital replications of the data, I still seek to preserve the original as a backup. The life expediency of magnetic media is largely undocumented; according to manufacturers, thirty years appears to be the upper limit for magnetic tape products, including video and audiotapes. The following are a few general guidelines for taking care of magnetic media.

General Guidelines

1. Handling and use should be minimized to reduce wear
2. Media should be of high quality from reputable suppliers
3. Archive copies should be made to guard against faults
4. Drives should be of good quality and well maintained
5. Tape should be handled only in no smoking, no food, clean areas
6. Avoid contamination of the tape by dirt, dust, fingerprints, food, cigarette smoke and ash and airborne pollutants
7. Do not drop or subject to sudden shock
8. Don't expose to sun, heat or excess moisture
9. Use high quality reels, cassettes and containers
10. Return tapes to containers when not in use
11. Do not use general purpose adhesive tapes to secure the tape end or for splicing
12. Minimize handling
13. Do not touch the tape surface or the edge of the tape pack unless absolutely necessary and then wear lint-free gloves
14. Clear the recorder tape path thoroughly at the recommended intervals
15. Discard tapes with scratches or any other surface damage because it causes debris to be left in the recorder tape path
16. Tape is least vulnerable to damage when wound in a smooth, even pack
17. Rewind tape at an interval of not more than 3 years. This relieves tape pack stresses and provides early warning of any problems
18. Do not let tape or leader ends trail on the floor
19. Cut off damaged tape or leader/trailer ends from open reel tapes
20. For open-reel tapes, use protective collars

Audio Tapes

Audiotapes are preserved by re-recording original recordings onto reel-to-reel tape, following nationally recognized preservation practices and guidelines. Analog copies properly stored are considered to be the best medium for long-term preservation of sound recordings.

Digital copies are the better option for access and use. CDs suffer less from wear and tear during use than reel-to-reel or cassette tapes. High quality CD-Rs are a stable medium with a good life expectancy.

Video Tapes
- Digital video formats are compressed and use very thin base films
- Compression methods degrade quality of video
- Mixing formats with different compression techniques degrades video quality; stay with one type of compression technique

Storage Guidelines for Videotapes:
1. Keep in cool, relatively dry environment (60-73F and RH 20-30%). Avoid fluctuations (no more than 7F).
2. Monitor storage environment with hygrothermograph.
3. Store tapes on metal shelves, preferably grounded. If shelves are motorized, store tapes away from motors. Store tapes upright and allow for air circulation. Don't store near magnetic fields created by motors, generators, television sets, elevators, headphones, speakers, microphones or magnets. Store duplicates and high quality masters in different locations.
4. Protect against accidental erasure by removing the record tabs.
5. Avoid contamination of tape surface. Touch open reel tapes by beginning and end only. Wash hands and use gloves.
6. After use, rewind to the end; don't store a tape that is stopped in the middle. Rewinding means you fast-forward the tape all the way to the end.
7. Use high quality, brand name tapes for copying and remastering.
8. Label minimally and with proper materials. Use archival labels which are non-acidic and which adhere without peeling off.
9. Use appropriate tape containers (strong and stable; resistant to dirt, dust and water; inert; able to be closed and latched securely).
10. If you ship tapes, be sure they are double-boxed, with space between tape cases and exterior boxes. Use safe packaging materials, not fiber-filled mailers. For tapes in preservation storage: 50F and 30%RH.
11. Keep storage and playback areas free from dust and other contaminants.
12. Protect tapes from liquid, light and heat and erasure. Store in their cases. Don't rewind after playing. Rewind just before playing.
13. From LC: materials to be preserved for a minimum of 10 years: store at 65-70F, 45-50% RH.
14. Materials having permanent value: 45-50F, 20-30% RH for magnetic tapes (open reel and cassette) and 45-50% RH for all others. Keep away from UV.
15. Videotapes will deteriorate over time. Store away from magnetic and electrical fields. Handle only by their cassettes. Don't use fast forward or fast reverse on playback equipment.

Strategy to Help Prevent Information Loss
In a situation where I am taking the original and cassette or video tape and making a digital copy, the wear and tear on the original is dramatically reduced. However, it is worth mentioning the use of multiple copies as another strategy for preventing loss of information. Recorded information can be lost because
- The medium on which it is recorded has deteriorated to the point of being unplayable. Information can also be lost if
- The tape on which it is recorded disappears (misplaced, stolen, destroyed by fire or flooding, and so forth).

Both types of loss can be prevented by maintaining more than one copy of the information and storing all copies in separate locations.

If you have tapes that have been sitting around for more that three years you can maximize the life span of the tape by recording the tape or simply playing it. Rerecording is normally recommended where prolonged tape pack stresses could cause damage to the tape. Some manufacturers have recommended that tapes be unspooled and rewound at regular intervals (often three years) to redistribute tape stress and prevent tape pack slip, cinching, and tape backing deformation. Rerecording requires that data be read from and written to the same tape periodically to refresh the magnetic signal and prevent data loss.

Watch Out for Stray Magnetism

Over the years I have be cautioned to keep media away from objects displaying even the smallest level of magnetism. The following are the types of magnetic fields that will or will not be harmful to your tapes:

Will not harm magnetic media:
- Walk-through metal detectors
- Some luggage screening fields at airports
- X-rays

Can harm magnetic media:
- Hand-held detectors
- Transformers
- Heavy electrical machinery and other very strong magnets
- Magnetizing forces of the order of 500 A/m and above

Projecting magnetic media when shipping
- The best protection for shipping magnetic media is minimum of 50 mm [2 inches] of nonmagnetic material all round. The inverse square law ensures that the fields from even heavy electrical equipment will not affect tape at 50 mm [2 inch] distance.
- Metallic boxes and foils offer NO useful protection against stray fields but may help exclude adverse environments.

How to Maintain a Cassette Deck

Cassette deck maintenance prevents and solves problems and improves recording and playback sound quality.

Cleaning Cassette Deck Heads
1. Dip cotton swab in anhydrous isopropyl alcohol and gently scrub heads (these are the parts that read the tape).
2. Dry the heads with the other end of swab.
3. Use fresh swab when one gets visibly dirty.
4. Repeat until the swab does not appear to be discolored. Tips & Warnings.
5. Clean heads after about 30 hours of use or according to the recommendations of the manufacturer.
6. Commercial head-cleaning fluids contain additives that will cause more harm than benefit.

Clean Tape Path Parts
1. Use a cotton swab and alcohol.
2. Clean capstan. Turn on deck to spin capstan (the metal spindle to the right of the tape heads that works with pinch roller to guide tape). Gently move swab up capstan shaft. Follow Steps 2 to 4 under "Clean Heads."
3. Clean pinch roller (the black rubber roller that works with capstan to guide tape). Rotate pinch roller with swab in tape path between capstan and pinch roller. Follow Steps 2 to 4 under "Clean Heads."
4. Clean stationary plastic and metal guideposts.
5. Clean under reel hubs.
6. Wipe remainder of tape well with a dry swab.

Tips & Warnings
1. Some decks have two capstans and pinch rollers. See the information that came with your deck to see where the parts are on your equipment.
2. Use rubber cleaner on pinch roller if you have it.
3. Clean the tape path when you clean the tape heads.

Demagnetize Erase and Record Heads
1. Use a commercial tape deck demagnetizer.
2. With the deck off, turn on (or plug in, if the demagnetizer doesn't have a switch) demagnetizer away from deck, other audio equipment and tapes.
3. Slowly move tip of demagnetizer toward head.
4. Make sure the demagnetizer doesn't touch the tape head (the magnetic field will cause it to try).
5. Slowly move the tip back and forth across the tape head for a few seconds. Get close to the head without touching it.
6. Slowly pull demagnetizer far away from head. Unplug demagnetizer after demagnetizing both heads.

Tips & Warnings
1. Look for a demagnetizer with a plastic-coated tip.
2. Only demagnetize if you start to hear distortion on your tapes.
3. A hi-fi shop might also demagnetize your heads for you.
4. Used improperly, a demagnetizer will increase head magnetization.
5. A demagnetizer can damage tapes, speakers and other audio equipment.

How to Fix Cassettes
If you have had any experience with cassettes, you can have the tape get caught in the inner workings of the cassette player or get bound up. When you have one of a kind information stored on the tape, it becomes imperative to try and fix the tape and salvage the information.. A broken tape or case can be repaired, though you'll need a little fortitude and ingenuity.

Replacing a Broken Case Step by Step Instructions
1. Purchase a new cassette that has a shell held together with small screws. Alternatively, you can buy a cassette shell from an electronics store.
2. Carefully take out the screws from the new cassette and lift the top off.
3. If your broken cassette case was held together by screws, do the same thing with that case. If it's glued together, very carefully separate the two halves by prying them apart with a screwdriver and working it around the edges of the case seams.
4. Remove the tape reels from the new cassette after taking careful notice of how the tape is threaded. Carefully transfer the reels of tape from the damaged cassette box to the new one, making sure that you thread the old tape the same way that the new tape was threaded. STEP 6: Replace the top of the new cassette shell and screw it together after checking to make sure the tape reel didn't get pinched.

Fixing a Broken Tape Step by Step Instructions
1. Purchase a cassette-tape splicing kit from an electronics store. The only way to fix a broken or damaged tape is by splicing it.
2. If the tape is still intact but one section is stretched or damaged, use a pencil to carefully pull the damaged section of tape from the case.
3. If the tape has snapped, open the cassette case to get access to the broken ends of tape. If your original cassette box is held together with screws, you'll be able to reuse it. Otherwise, follow steps 1 through 4 under "Replacing a broken case."
4. Follow the instructions that came with your tape-splicing kit to remove the damaged ends of tape and splice the tape back together.
5. Rethread the tape and replace the case top if you removed it. If you had to break apart a glued case, follow steps 5 and 6 under "Replacing a broken case" for transferring the tape to a new case.

Overall Tips & Warnings
1. Cassette tapes won't last forever, even if they are carefully stored. Ten years is asking a lot of most tapes.
2. Recordings that you want to preserve longer should be copied to new tapes or, even better, to CD-R media.
3. Any repaired cassette is liable to break again, so make a copy of the material you've got stored on it as soon as possible.

How to Buy Blank Cassettes

As you look to preserve tapes or continue to use cassettes in capturing family history, start by choosing good tapes. Match the tape you choose to both your tape deck and what you're recording.

Step by Step Instructions
1. Check your tape deck's manual for the manufacturer's recommendations.
2. Buy "normal bias" Type I tapes for use with mini-recorders.
3. If you're playing tapes on a boom box, personal stereo or low-end car deck, buy Type I tapes unless the playback unit has a switch for "high bias" Type II tapes.
4. Choose "metal bias" Type IV tapes if playing tapes on a high-end cassette deck.
5. Check the Maximum Output Level (MOL) specification to compare tapes and brands within a type. Higher numbers are better.
6. Buy Type I tapes for recording speech.
7. Choose Type I tapes or lower-grade Type II tapes for dubbing from one cassette to another.
8. Buy Type II or Type IV tapes if recording live music on a deck.
9. Select higher-grade Type II or Type IV tapes for recording from LP or CD.

Tips & Warnings
1. Higher-grade tapes within a type are typically distinguished by an "X" or an "S" model number.
2. Most tape decks automatically set the bias for the type of tape by reading notches on the cassette.
3. "C" indicates the total number of minutes on the tape.
4. Type II tapes can record higher frequencies than Type I tapes and have a higher signal-to-noise ratio. Type IV tapes are even better.
5. C-120s use thinner tape, which is more prone to jamming and breaking.

Long-term Maintenance of Digital Image Files

Digital preservation and long-term maintenance of your digital files is a very serious matter. With technology changing so fast, there are no absolutes about the exact formula for digitally preserving our family heritage which will be a combination of artifacts that include text, data, and images, audio and video. However, there are some best practices of archivists that have responsibility for preserving our national and cultural heritage that we can learn from.

Key Preservation Principles
- Select and create digital collections of long-lasting value.
- Store digital media with care.
- Develop preservation strategies and implement them systematically.
- Consider a hybrid approach where hard copy print are created in addition to digital files.

Storage Requirements for Digital Files
- Store master images on high quality, industry standard digital tape, magnetic disks, or CD-R. (The gold colored CD-R are of much better quality than the silver ones).
- CD-Rs should only be labeled with archival quality adhesive labels and not with markers.
- Create backups of the master files and store them off-site in a secure location. It is recommended that three copies be kept of each file.
- Store media in a controlled environment. The accepted ranges for temperature are from 62-68 degrees (65 degrees is optimum) and relative humidity should be within a 35-45% range with 40% optimum. Consistency of temperature and humidity is more important than absolute levels. The storage area should not be in an attic, basement or other area prone to sudden changes in temperature or humidity.
- Store all media away from strong magnetic fields.
- Maintain a clean, dust-free environment.
- Minimize the handling of master images and the media on which they are stored.
- Digital files maintained for an extended period should be refreshed periodically by placing them onto new media. Follow the recommendations of the manufacturer.
- Develop a system to periodically check the readability of digital files.

Requirement: Regularly Back Up Data Digitized Archives

Now that you are well into digitizing your family history, safe storage and backup should be your first priority. The type of files that will be part of your backup plan includes images, email, website files, and notes.   Imagine losing days, weeks, months or even years worth of work. If you haven't felt the pain of losing files yet, your day is coming. Count on it, you will have a crash and loss of data, it's just a matter of time. Some of the important questions you must consider include:

- Where should you keep your files?
- Who can access and possibly alter them?
- What happens if there is a fire or flood?

The fundamental rule of storage is to have copies or "backup." It's not uncommon for us to get caught up in the false security that "it won't happen to me." I personally spend a minimum of eight hours a day at a computer, backup weekly, and never had a hard drive crash, except in the last six months when I lost four hard drives. That's right, four gone, I couldn't recover the data.

One of the drives had my entire ten years worth of research on it. Why? After extensive consulting with the several hardware "gurus," extensive reading, and a lot of solution combinations, I/we were able to rule out every possible problem. That's right, the answer to my problem was "fate."   I was grateful that I did have a backup system in place.   I did lose a couple weeks work in one case, but imagine losing ten years worth of work. What did I end up doing, you ask? I took the opportunity to upgrade to a new system, making sure I had sufficient and continuous power supply, airflow, and backup capability.

1. **Backup doesn't need to be a complex strategy.** The following are good practices that will help ensure the preservation of your family history.

2. **Store copies in more than one place.** For example, store a copy in a safe-deposit box at your bank, desk drawer, or give sets of your files to different family members on DVD/CD's. It is wise to keep at least one copy of your files away from your home.

3. **Refresh or recreate copies of your backup on a regular bases such as every Tuesday or the first of every month.** A lot of it depends on how much work you are doing and how comfortable you are with data loss. If you are in a period of time where you are doing extensive amounts of scanning, data entry and so forth, you will probably want to backup everyday.

4. **Check to make sure, every so often, that these copies are readable.** For example, if you have your work out on another webserver, chances are they will be ok, but these servers have been known to fail also.

5. **Tell others or record on paper the location of backups so they are available if you are not.** I would encourage you to have at least one copy of your backup as a hard drive. They are the fastest way to backup and transfer information. And then I would have at least one other copy on another form of media, CD/DVD's (recordable for PC's), tape, and high-capacity digital cassettes.

Do you realize that there have been no fewer than 32 distinct media formats for packing up digital information since the advent of computing. I remember when I bought my first computer in the early 1980's, it came with a diskette. Since then I have used 5 ¼ inch floppy's, Syquest cartridges, tape backup, Zip disks. If there is anything I have learned is to stay with the mainstream media.   CD/DVD's and their next generation replacements will generally have media that will be inexpensive and low cost hardware to record to the media. For less than a $100, you can take care of most, if not all of your backup needs.

What about other media (e.g., zip drives). The biggest issue is readability and distribution. Relatively speaking, few people have adopted the other media formats. The costs are usually far and above the other formats, for example a zip disk cost a minimum of 20 times more for CD/DVD with the same capacity.

One of the popular mediums today is the "thumb-drive" or "key-chain" USB drives. They are both a drive and storage device. They are great for mobility, but if you need more storage, you can't simply expand the storage; you have to buy another drive.

How long will media last?

The estimates range from 20 on the low end to 200 years for media such as CD/DVDs on the high-end under the ideal conditions. Given issues surrounding improper storage and varying qualities of manufacturing quality, you may find some of your backup becoming "worthless" in just a few years. Few, if any, life expectancy reports for these discs have been published by independent laboratories. An accelerated aging study at The National Institute of Standards and Technology (NIST) estimated the life expectancy of one type of DVD-R for authoring disc to be 30 years if stored at 25°C (77°F) and 50% relative humidity.

Digital Data Preservation Program CD and DVD Archiving
Quick Reference Guide for Care and Handling

The National Institute of Standards and Technology (NIST) recommend the following for optimizing the preservation of CD/DVD backups.

Do:
1. Handle discs by the outer edge or the center hole.
2. Use a non solvent-based felt-tip permanent marker to mark the label side of the disc.
3. Keep dirt or other foreign matter from the disc.
4. Store discs upright (book style) in plastic cases specified for CDs and DVDs.
5. Return discs to storage cases immediately after use.
6. Leave discs in their packaging (or cases) to minimize the effects of environmental changes.
7. Open a recordable disc package only when you are ready to record data on that disc.
8. Store in a cool, dry, dark environment in which the air is clean.
9. Remove dirt, foreign material, fingerprints, smudges, and liquids by wiping with a clean cotton fabric in a straight line from the center of the disc toward the outer edge.
10. Use CD/DVD cleaning detergent, isopropyl alcohol or methanol to remove stubborn dirt or material.
11. Check the disc surface before recording.

Do not:
1. Touch the surface of the disc.
2. Bend the disc
3. Use adhesive labels.
4. Store discs horizontally for a long time (years).
5. Open a recordable optical disc package if you are not ready to record.
6. Expose discs to extreme heat or high humidity.
7. Expose discs to extreme rapid temperature or humidity changes.
8. Expose recordable discs to prolonged sunlight or other sources of UV light.
9. Write or mark in the data area of the disc (area where the laser "reads").
10. Clean in a circular direction around the disc.

For CDs especially do not:
1. Scratch the label side of a CD.
2. Use a pen, pencil, or fine tip marker to write on the disc.
3. Write on the disc with markers that contain solvents.
4. Try to peel off or re-position a label.

General Recommendation for Long-term Storage Conditions
For archiving recordable (R) discs, it is recommended to use discs that have a gold metal reflective layer.

Archival Storage
Recommendation for storing CDs and DVDs together
Media Temperature: Less than 20°C (68°F)
                                       Greater than 4°C (39°F)
Relative Humidity (RH):   20% to 50% RH

- A temperature of 18°C and 40% RH would be considered suitable for long-term storage.
- A lower temperature and RH is recommended for extended-term storage.

For more information than you ever wanted to know about CD/DVD and their use in archiving, see the following link:

- Care and Handling of CDs and DVDs —A Guide for Librarians and Archivists
  http://www.itl.nist.gov/div895/carefordisc/CDandDVDCareandHandlingGuide.pdf

Important Note About Sunlight and DVD/CDs
Direct sunlight to R discs is harmful for two reasons:
1. The sunlight's ultraviolet photons (the higher frequency of the sunlight spectrum) have enough energy to produce a photochemical reaction, altering the optical properties of the dye (recording layer) molecules.

2. The broad spectrum of unfiltered sunlight, infrared to ultraviolet (low frequency to high), can impart heat to the disc. The increased temperature generated by sunlight will accelerate the degradation or breakdown of the dye layer (recording layer) of the disc. The combination of high temperature and high relative humidity will further accelerate that degradation.

CD/DVD's Can Become Unusable in a Matter of Days
If such a disc is left in an environment that allows direct sunlight and extreme heat buildup (e.g., on the dashboard of a car in summertime, or next to a heater by a window), the organic dye or phase-changing film that holds the data will degrade quickly, causing the disc to become unreadable. A disc is not protected from the effects of heat buildup if left in a case that is exposed to direct sunlight or other sources of heat. Extreme heat buildup can also cause warping of the disc.

Backup Your Data to the Web

Another option for data archiving is to backup your data to the web. Web-based storage services let you back up your data, store your files on a web server, or share them quickly and simply with anyone, often at no cost. Two highly rated services include:

- IBackup--backup service.
- GoDaddy Online File Folder for storage sites.

  For more information see:
  Store It on the Web
  http://www.pcworld.com/article/id,117413-page,1/article.html

CD vs. Data DVD for Storage of your High Resolution Scans

After creating your digital images they need to be saved to some type of digital media for storage purposes. Common choices for most genealogists include CD and Data DVD. The charts below compare the pro's and con's of each format using the Mitsui MAM-A Gold Archival quality CD-Rs and Taiyo Yuden DVD-R media for our Data DVDs. Both of these are high quality storage mediums that far exceed the quality of media you might find at your local Wal-Mart. To learn more about Archival Quality CD-R, visit, MAM-A's website at www.mam-a.com

Pros & Cons of CD-R and Data DVD-R Media			
Scan Resolution	Conventional CD-R	Mitsui Gold Archival Quality CD-R	High Quality DVD-R
Estimated Lifespan	< 75 Years	300 Years	Great 100 Years
Capacity	Capacity 650 Megabytes	650 Megabytes	4,700 Megabytes

CD: Mitsui Gold Archival CD-R		Data DVD: Taiyo Yuden DVD-R	
Pros	**Cons**	**Pros**	**Cons**
Estimated lifespan of 300 Years, much longer than DVD-R's expected lifespan.			Estimated lifespan of 100 years. DVD's are not expected to last as long as Archival Quality CD-R media.
	CD-R's only hold 650 MB of data. Much less than DVD-R media.	DVD-R's hold 4,700 MB of data, a little more than 7 times that of CD-R's.	
	Higher Order Cost: CD-R's hold fewer photos than DVD-R's. More disks will be needed if you're placing a large order.	Lower Order Cost: Because DVD-R's hold more photos you will need fewer disks when placing a large scanning order.	
CD's work with just about any computer and don't require a DVD-Rom to be installed on your system.			To use a DVD with your computer you must have a DVD-Rom installed in your system.
	Less Organized: Less photos per disk means you may have to find the right disk to get the photo you want.	More Organized: It's easier to find the photo you're looking for because you'll have fewer disks.	
* Media Lifespans are based on manufacturer's estimates.			

As you can see from the charts each format has some benefits. If you want media that will last as long as possible then Mitsui CD-R is the way to go. If you want to be organized while keeping the cost of your order down then Data DVD is the option for you. Please remember that you will need a computer with a DVD-Rom to use our Data DVDs.

How Many Photos Will Fit On One Disk?

This depends on the type of photo or film that is scanned, the resolution the photo was scanned at, and the file format the photo was saved to. We offer two file formats, TIFF and JPEG. Click here to learn more about TIFF & JPEG formats. The charts below list the number of photos that may be stored on one CD or Data DVD. The first chart is for 35mm slides or negatives. The second chart is based on print scans of either 300dpi or 600dpi organized by the size of the print scanned.

Film Scanning: Number of Files that May be Saved to One Disk				
	Number of Images @ 300 DPI			
	CD		Data DVD	
Print Size	TIFF	JPEG	TIFF	JPEG
2000 DPI	46	185	330	1,340
3000 DPI	20	95	145	690
4000 DPI	11	68	82	495
* These numbers are estimates actual number of files per disk may vary slightly.				

Print Scanning: Number of Files that May be Saved to One Disk								
	Number of Images @ 300 DPI				Number of Images @ 600 DPI			
	CD		Data DVD		CD		Data DVD	
Print Size	TIFF	JPEG	TIFF	JPEG	TIFF	JPEG	TIFF	JPEG
3 x 5 Scan	166	787	1200	5600	41	216	297	1565
4 x 6 Scan	103	464	746	3350	25	135	185	975
5 x 7 Scan	70	325	510	2350	17	100	127	725
8 x 10 Scan	30	162	221	1175	7	59	55	425
* These numbers are estimates actual number of files per disk may vary slightly.								

Optimizing Your Computer Performance

Clean up disk errors--Run once a week. Whenever a program crashes, or you experience some power outage, your computer may create errors on your computer's hard disk. Over time, the errors can slow your computer. Luckily, the Windows operating system includes a Disk Check program to check and clean any errors on your computer and keep it running smooth.

Free Up Disk Space --Run once a week. By freeing disk space, you can improve the performance of your computer. For example: Your computer can pick up and store temporary files when you're looking at Web pages and even when you're working on files in programs, such as Microsoft Office Word. Over time, these files will slow your computer's performance. You can use the Windows Disk Cleanup screen to rid your computer of these deadbeat files.

The Disk Cleanup tool helps you free up space on your hard disk. The utility identifies files that you can safely delete, and then enables you to choose whether you want to delete some or all of the identified files.

> Use Disk Cleanup to:
> - Remove temporary Internet files.
> - Remove downloaded program files (such as Microsoft ActiveX controls and Java applets).
> - Empty the Recycle Bin.
> - Remove Windows temporary files.
> - Remove optional Windows components that you don't use.
> - Remove installed programs that you no longer use.

Rearrange Your Data and Speed Up Access to Data--Run once a month. Don't be shocked, but your computer can get sloppy. Your computer often breaks files side by side to increase the speed of access and retrieval. However, as files are updated, your computer saves these updates on the largest space available on the hard drive, often found far away from the other adjacent sectors of the file.

Disk fragmentation slows the overall performance of your system. When files are fragmented, the computer must search the hard disk when the file is opened to piece it back together. The response time can be significantly longer.

Disk Defragmenter is a Windows utility that consolidates fragmented files and folders on your computer's hard disk so that each occupies a single space on the disk. With your files stored neatly end-to-end, without fragmentation, reading and writing to the disk speeds up.

When to Run Disk Defragmenter. In addition to running Disk Defragmenter at regular intervals, optimally monthly, certain events warrant running the utility outside of the monthly rule of thumb.

You should run Disk Defragmenter under the following circumstances:
- You add a large number of files.
- Your free disk space nears 15 percent.
- You install new programs or a new version of Windows

Make Internet Explorer run faster. The World Wide Web is a sparkling achievement of modern society. It's everywhere—from the home to the classroom. We use it to communicate, to work, to play—even to waste time when there's nothing else to do.

Yet there's nothing more frustrating than having this technical marvel at our fingertips 24 hours a day, 7 days a week, only to watch our computers access the Internet at a crawling pace.

- Reduce the size of your Web page history. Internet Explorer stores visited Web pages to your computer, organizing them within a page history by day. While it's useful to keep a couple days of Web history within your computer, there's no need to store more than a week's worth. Any more than that and you're collecting Web pages that will slow down your computer's performance.

- Don't save encrypted Web pages. Encrypted Web pages ask for usernames and passwords. These pages scramble information to prevent the reading of this sensitive information. You can define Internet Explorer to not save these types of pages. You'll free up space by saving fewer files to your computer, as well as keeping secure information off your computer.

Automate Microsoft Update-Configure once. Microsoft works constantly to release updates to Windows and other Microsoft products, including Office. At Microsoft Update, you can find and install all these updates—not just the critical ones. Often, these updates will improve your computer's performance.

You can make life easier by automating Microsoft Update so your computer downloads and installs all the updates without you having to worry about them.

Install Antivirus and Antispyware Programs. Computer viruses and spyware (hidden software that gathers information about you without your knowledge or consent when you're using a computer) both reduce system performance. Computer viruses can not only reduce performance, but they can also destroy data. Any computer that accesses the Internet should have antivirus and antispyware programs installed.

- Antivirus programs: Two of the most reliable computer virus programs around are Norton Internet Security and McAfee Internet Security Suite.

Tip: Typically, temporary Internet files take the most amount of space because the browser caches each page you visit for faster access later.

For more information see:
Optimize your computer for peak performance
http://www.microsoft.com/athome/moredone/optimize.mspx

Digitizing Your Family Movies
http://genealogy.about.com/od/digital_editing/a/videotapes.htm

Resources

10 Big Myths about copyright explained
http://www.templetons.com/brad/copymyths.html

Associations of Recorded Sound Recordings
http://www.arsc-audio.org/

Batch Scanning Tips
http://www.hamrick.com/bat.html#transparency

Cleaning LP records
 http://www.artsandmedia.com/lpclean.html

Close-up photography
 http://www.hp.ca/portal/hho/dpc/take_photos/capture_close-ups.php

Computing Outloud
http://www.out-loud.com/

Compositioning
http://www.tech2.com/india/topstuff/digital-cameras/get-the-best-out-of-your-digicam-ii/3819/2

Convert Cassette Tapes to CD
http://www.help2go.com/Tutorials/MP3%10Audio/Convert_Cassette_Tapes_to_CD.html

Copyright Concerns
http://www.buyerzone.com/computers/scanners/copyrightpg1.html

Digital Text, Scanning, and Copyright Law
http://www.alltech-tsi.org/resources/digital-text.php

File Format
http://searchsmb.techtarget.com/sDefinition/0,290660,sid44_gci834191,00.html

How to Burn a Music CD Using Windows Media Player 9
http://www.wikihow.com/Burn-a-Music-CD-Using-Windows-Media-Player-9

How to Buy Blank Cassettes
http://www.ehow.com/how_2658_buy-blank-cassettes.html

How to Change Your Records Into CDs
http://www.wikihow.com/Change-Your-Records-Into-CDs

How to Fix Audiocassettes
http://www.ehow.com/how_114047_fix-audiocassettes.html

How to Maintain a Cassette Deck
http://www.ehow.com/how_10507_maintain-cassette-deck.html

How To Record Vinyl Records (singles and LPs) to Audio CDs and MP3 files
http://www.br0wn.co.uk/vinyltocd.htm

How to Scan a Book
http://www.proportionalreading.com/scan.html

How To Scan a Slide
http://photography.about.com/cs/digital/ht/Scan_Slides.htm

How to Scan Photos For Archiving
http://www.progeneologists.com/scanphotos.htm

How to take care of vinyl
http://www.linnrecords.com/linn-vinylcare.aspx

How to Track Your Web Research
http://www.wikihow.com/Track-Your-Web-Research

How to Transfer Cassette Tape to Computer
http://www.wikihow.com/Transfer-Cassette-Tape-to-Computer

HP Digital Photography
http://www.hp.ca/portal/hho/dpc/print_create_share/download_photos.php

Image Scanner
http://en.wikipedia.org/wiki/Image_scanner

Magnetic Tape Storage and Handling
http://www.clir.org/pubs/reports/pub54/3prevent_loss.html

Measuring Audio Quality,
http://www.itworld.com/AppDev/1469/NWW1204revside4/

MP3Pro Zone,
http://www.mp3prozone.com/

OCR - What It Is, How to Do it Better
http://desktoppub.about.com/cs/ocr/a/ocr.htm

Ogg Vorbis,
http://www.vorbis.com/

Outdoor photography
http://www.hp.ca/portal/hho/dpc/take_photos/outdoor_photography.php

PC Recording,
http://www.pcrecording.com/

Pick Your Scanning Resolution
 http://desktoppub.about.com/od/scanningresolution/l/aa_scanspi.htm

Preserving History Digitally
http://chnm.gmu.edu/digitalhistory/preserving/

Print Scans vs. Film Scans
http://www.digitalmemoriesonline.net/scan/scan_processing/prints_vs_film_scanning.htm

Real Networks,
http://www.real.com/

Recording Digital Sound
http://www.ukoln.ac.uk/qa-focus/documents/briefings/briefing-23/html/

Sharing photos via e-mail
 http://www.hp.ca/portal/hho/dpc/print_create_share/send_photos_email.php

Slicing and Dicing MP3 bit rates,
http://www.digitalprosound.com/Htm/WebAudio/2000/Oct/MP3bitrates.htm

Society of American Archivists
www.archivists.org

Take Better Photos
http://www.hp.ca/portal/hho/dpc/take_photos/take_better_photos_1.php

Technical Guidelines for Digitizing
http://www.archives.gov/preservation/technical/guidelines.pdf

Transferring LPs to CDR: Some Advice
http://www.delback.co.uk/lp-dr.htm#record_play

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 http://www.hp.ca/portal/hho/dpc/take_photos/travel_photos.php

Turn Your Vinyl LPs Into CDs
http://www.g4tv.com/techtvvault/features/46394/Turn_Your_Vinyl_LPs_Into_CDs.html

Use Your Photo Paper and Printer Right
http://www.spotonliving.com/2006/12/19/use-your-photo-printer-and-photo-paper-right-photo-printing-tips-and-resources/

Wet-weather Photography
http://www.hp.ca/portal/hho/dpc/take_photos/rainy_day_photos.php

Wilhelm Image Research
http://www.wilhelm-research.com/

Xorys' MP3 FAQ,
http://webhome.idirect.com/~nuzhathl/mp3-faq.html